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DEVOTED TO TEXTILE WET-PROCESSING

contents

VOLUME 48 MARCH 9, 1959 NUMBER 5

aatcc proceedings

featured articles

Modern Finishes for Modern Fabrics 41
S N Glarum
An Adventure in Research—The Development of a "Wash-Wear Finish" 44
Herman B Goldstein
Chemicals for Nonwoven Fabrics 49
John T Taylor

miscellaneous

197th Meeting—Technical Committee on Research 35
Elected to Membership 54
Membership Applications 54
AATCC Calendar 55
Activities of the Local Sections 56
Employment Register 58

departments

News of the Trade 59
General Calendar 61
New Products and Developments 62
Names in the News 70

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Proceedings of the

American Association of Textile Chemists and Colorists

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March 9, 1959

Minutes———

197th Meeting
TECHNICAL COMMITTEE ON RESEARCH

THE 197th meeting of the Technical Committee on Research was convened at 1:30 pm on Thursday, January 29, 1959 in the Colonial Room of the Sheraton-McAlpin Hotel, New York, New York, with the chairman presiding. The following members were present:

C A Sylvester, Chairman
M J Babey, Vice Chairman
W D Appel
R F Aurich
C A Baker
V L Chase
R E Derby Jr
C W Dorn
P J Fynn
R C Geering
N F Getchell
H B Goldstein
H E Hager
T H Hart
W A Holst
C Hooper
R W Jacoby
A L Johnson
E W Lawrence
G J Mandikos
J E Norton
A D Nute
W F Prien
F A Prisley
F J Rizzo
C H A Schmitt
G M Smith
R B Smith
P B Stam
J G Stass
J E Straley
R L Stutz
L S Thompson
J F Warner
G W Wernz
G S Wham
M W Winkler
P J Wood
R K Worner
C L Zimmerman

Others Present:

C L Clutz
R E Derby
H E Glidden
R T Graham
M J Greene
C E Hilton
G M Kidder
W Klaas
W G Parks
J P Patton Jr
M J Reider
G M Richardson
J W Richardson
C W Saaltrank
P J Smith
H W Stiegler
G R Thompson

Chairman Sylvester opened the meeting by presenting his annual report as follows:

"The Technical Committee on Research held three meetings in 1958, one in New York, one in Philadelphia and one in Charlotte, NC, in which it participated in the technical program sponsored by the Piedmont Section.

"During the year special emphasis has been placed on ways and means to improve our research program. Added stress has been placed on the development of end-use performance tests. In an effort to provide our research committees with the most effective and modern working tools, an advisory committee has been established on the use of statistics in developing test methods.

"The theme of the Chicago Convention was keyed to our research activities. Sixteen committees presented outstanding exhibits illustrating the effective and outstanding job that is being done by AATCC research. One of the features of the Convention was a research symposium sponsored by the Technical Committee on Research.

"New Tentative Test methods approved by TCR this year include—

1) Alternative Dynamic Immersion Absorption Test—Tentative Test Method 70A-1952. This test utilizes steel tubes and the Launder-Ometer instead of the large, difficult-to-obtain apparatus now specified.

2) Colorfastness to Pleating—Tentative Test Method 31-1958. This Method of test specifies different temperatures and provides for the newer fibers.

3) Detection of Antibacterial Property of Fabrics—Agar Plate Method, Tentative Test Method 90-1958, a much-needed test.

4) Wash and Wear Fabrics—Appearance after Home Laundering, Tentative Test Method 88-1958. In the development of this test, over 15,000 tests were made utilizing eighteen different laboratories. It fills a definite need of the textile industry.

5) Colorfastness of Textiles to Industrial Laundering, Tentative Test Method 87-1958. The development of this test culminated several years of research activity.

6) Determining the Presence of Mercerization in Cotton—Tentative Test Method 89-1958. This test provides a method for the determination of the presence of mercerization in dyed and undyed cotton yarns and fabrics.

7) Dimensional Changes in Woven Textiles (Excluding Wool)—Tentative Test Method 91-1958. Four test procedures are established varying in severity from very mild to very severe and intended to cover the range of practical washing from commercial procedures to hand washing.

8) Damage Caused by Retained Chlorine—Tentative Test Method 92-1958. A number of refinements have been made in this test method.

"The Committee On End-Usage Performance tests has devised a method for the collection and compilation of data by AATCC on consumer complaints which would be supplied by industry on a volunteer basis. It is thought that this information will be of considerable value by revealing areas in which new test methods are needed.

"A 'Committee on Determination of Oders in Resin-Treated Fabrics' has been set up for the purpose of developing a test method for measuring the odor propensity of resin-treated fabrics.

"Certificates of merit were awarded to the following members who retired as chairmen of TCR Committees in 1957—

	Retired As Chairman of Committee On
Osborne C Bacon	Standard Soils
Kenneth H Barnard	Nuclear Radiation
George M Gantz	Bleaching
E Wallace Birdsall	Resistance to Insect Pests
Frank J O'Neil (Deceased)	Color
Philip B Roth	Water Absorbency
Victor S Salvin	Colorfastness of Textiles to Atmospheric Contaminants
John K Sumner	Nonwoven Fabrics (Joint with (ASTM)
George A Slowinske	Water Resistance of Fabrics
Max W Winkler	Rapid Control Tests
P J Wood	Analytical Methods

"These are but a few of the highlights of 1958. All of our committees (38 active and 29 reference) have done an excellent job effectively implemented by our research staff at National Headquarters. The test methods which have been developed are used daily in the evaluation of colorfastness and other properties of textiles. Their use is creeping into other fields.

"We are justly proud of our research program and are looking ahead to another year of progress and achievement in 1959."

The chairman then read the following list of nominations for new research committee chairmen to replace those whose term of office expired at this meeting:

Committee on Resistance to Abrasion—Norman B Gobeil, J P Stevens Co, replacing T F Cooke, American Cyanamid Co.

Committee on Colorfastness to Crocking (Rubbing)—Charles R Trommer, Boris Kroll Labs, replacing Henry E Millson, American Cyanamid Co.

Committee on Definitions—John H Menkart, Harris Research Labs, replacing L R Burgess, Reeves Bros.

Committee on Evaluation of Desizing Agents—Fredrick J DiCarlo, The Fleischmann Labs, replacing P V Seydel, Seydel-Woolley & Co.

Committee on Dermatitis—David W Fasset, Lab of Industrial Medicine, Eastman Kodak Co, replacing J A Zapp, Jr, E I duPont de Nemours & Co, Inc.

Committee on Drycleaning Test Methods—Robert T Graham, National Institute of Drycleaning, replacing A E Johnson, National Institute of Drycleaning.

Committee on End-Usage Performance Tests—A E Johnson, National Institute of Drycleaning, replacing Jules Labarthe, Carnegie Institute of Technology.

Committee on Identification of Finishes on Textiles—T D Miles, Quartermaster Corps, replacing B R Norwick, Beaunit Mills Inc.

Committee on Evaluation of Fire-Resistant Textiles—W G Parks, Univ of Rhode Island, replacing L L Heffner, North Carolina State College.

Committee on Flammability of Clothing Textiles—Cameron A Baker, U S Testing Co, Inc, replacing R C Geering, Princeton Knitting Mills.

Committee on Colorfastness to Perspiration—C H A Schmitt, Sandoz, Inc, replacing C Minoff, Texstyle Corp.

Committee on Colorfastness to Pleating—Charles W Saalfrank, Sandoz, Inc, replacing J Ernest Meile, Consultant.

Committee on Colorfastness to Wet and Dry Pressing—William Anderson, U S Testing Company Inc, replacing M W Goodell, E I duPont de Nemours & Co, Inc.

Committee on Stream Sanitation—P Theel, Philadelphia Textile Institute, replacing R Hobart Souther, Cone Mills Corp.

Committee on Wash and Wear—G M Richardson, E I duPont de Nemours & Co, Inc, replacing G S Wham, Good Housekeeping Inst.

Committee on Weathering of Textiles—L L Heffner, North Carolina State College, replacing F J Rizzo, Quartermaster Corps.

The following roster for the new Committee on Determination of Odors in Resin-Treated Fabrics was submitted: P J Fynn, J C Penney Co, *chairman;* F K Burr, Fabric Research Laboratories, Inc; E Curry, Burlington Finishing Co; L B Hallows, American Cyanamid Co; M E Heard, West Point Mfg Co; W H Masterson, Better Fabrics Testing Bureau; R C Squier, Joseph Bancroft & Sons Co; J E Smith, E I duPont de Nemours & Co, Inc; P B Stam, J P Stevens & Co, Inc; R L Wayland Jr, Dan River Mills.

V D Lyon of E I duPont de Nemours & Co, Inc, was nominated as the AATCC member to represent the ASA on the ISO Committee on Colour Fastness to Vulcanization.

Other committee appointments include the following:

L C Kolodny, J P Stevens & Co, Inc, to Committee on Water Resistance of Fabrics.

Max Silverman, Sherwin-Williams Co, to Committee on Drycleaning Test Methods.

Alfred W Spencer, Sandoz, Inc, to Committee on Colorfastness to Washing.

John P McNally, National Cotton Council, to Committee on Resistance to Abrasion.

Louis Mizell, Harris Research Labs, to Technical Committee on Research.

A motion was made and seconded that the chairman's annual report be published in the *1959 Technical Manual* and that all nominations for appointment to research committees, as listed above, be submitted to ECR for approval. The motion was adopted.

The Committee on Antistatic Finishes requested that the status of Tentative Test Method 76-1954 be changed to that of a Standard Test Method. This test has been revised editorially.

COMMITTEE ON DRYCLEANING TEST METHODS———A E Johnson, retiring chairman, reported as follows:

"The Committee met in the offices of Better Fabrics Testing Bureau to review the results of a series of tests on various types of dyed and printed fabrics. It is agreed that the proposal to run the present test TTM #85-1957 at 160°F without soap for better correlation with repeated commercial drycleanings has merit and should be given further consideration. The Committee will continue its study of this new principle to include additional types of fabrics with a view to determining whether a change in TTM #85 in line with these findings should be recommended.

"The Committee also considered a proposal to recommend the adoption of a shrinkage in drycleaning test based on the principle of relaxation induced by steam pressing. It was agreed that such a test can be depended upon to reveal the more troublesome types of fabrics although the data presented for study showed that shrinkages obtained this way were inconsistent with shrinkages found in actual drycleanings. William Masterson of Better Fabrics Testing Bureau and Genevieve Smith of Sears, Roebuck were named as a subcommittee to edit the proposed test, which is to be called 'Shrinkage in Steam Pressing.'

"The committee recommended Robert Graham of National Institute of Drycleaning as chairman to succeed A E Johnson."

COMMITTEE ON EVALUATION OF FULLING AGENTS———At the request of H W Wolf, chairman of the Committee on Evaluation of Fulling Agents, G M Kidder read the following report:

"It may seem rather incredible or even absurd that a committee should find so much difficulty in studying a textile process of such antiquity when I recall the interesting discussion recently published in the *Ciba Review.*

"We have been fortunate to have a prototype of a small fulling machine to initiate our preliminary evaluations. I am referring in particular to the modified version of the La Fleur machine, which was made available through the joint efforts of E F Drew and Co, and the Forstmann Woolen Co. However, our first interlaboratory test using the small machine was a dismal failure, but possibly from these negative results many of the fundamentals involved in the fulling operation were brought to light, such as, the adjustment of the throat, the roll pressures, the linear speed, the trap loading and design, the size of the fabric samples, etc. We therefore feel that we have arrived at a stage where we can look forward to specifying a preliminary method for evaluating fulling agents. The laboratory machine is now a workable instrument and the basic variables can be adjusted to full most of the common type of fabrics using a rather wide variety of chemical agents.

"We are now in the process of analyzing the results of a recent interlaboratory test involving four different fulling agents in which six

laboratories participated. Each laboratory was furnished with a standard blanket fabric containing 100% wool, 10 ounces per sq yd in raw weight, for the trial. In addition, the laboratories were instructed to full a fabric of their own choice with the four agents. It was quite rewarding, as shown in the brief analysis, that the laboratories were able to rank the fulling rate of these agents in the same order. The levels of the fulling rates differed between the laboratories since certain operating procedures were unique for their particular machines. However, the main point is that these differences now can be accounted for. Briefly, the machine shows that 100% wool fabric subjected to the action of an acid fulling agent under the tentative mill procedure will shrink the material two and one-half to three times the rate that a five-oz (per gallon) soap solution will under the same conditions. On the other hand, various builders incorporated with soap and other agents appreciably affect the fulling rate as well as giving a drastic increase in the removal of oil.

"It should be mentioned that the properties of the fulling agents, such as their detergency, their effect on hand (such as giving cover), and the hardness of the felt, also are subjects for evaluation. The fiber content has an important bearing on the fulling study since it appears that acid fulling agents affect the fulling of coarser wools more drastically than the finer wools. Many of these points, and possibly others are now the intended points for further study.

"In closing, I would like to take the opportunity to thank the Technical Committee on Research for its encouragement, E F Drew and Co for its aid in the construction of the machines, the various manufacturers of fulling agents for supplying materials of known content as well as the manufacturers of fulling machines for their valuable data on construction and operational details."

COMMITTEE ON WATER RESISTANCE OF FABRICS——Ruby K Worner, chairman of the Committee, reported as follows:

"Two projects are in progress involving interlaboratory tests of laundered and unlaundered fabrics:

1) To determine the correlation between the use of the six-liter tumble jars and the alternative method using the stainless-steel containers in the Launder-Ometer. (George A Slowinske is chairman of this task group).

2) To study the properties (particularly water absorbency) of different blotters from different manufacturers to determine their importance in prescribing blotters in the different water resistance tests. (Carlo DeMarco is chairman of this task group).

"George Mandikos is an active cooperator in both studies.

"The 'rain test' for resistance to water penetration (Standard Test Method 35-1952) is to be written in appropriate document format for submission by the secretary of Committee L-23, ASA to the British secretariat, which in turn will submit it to the member nations of ISO TC/38 (International Organization for Standardization) for comment."

COMMITTEE ON END-USAGE PERFORMANCE TESTS——P J Fynn, secretary, reported for the Committee on End-Usage Performance Tests as follows:

"In the absence of our chairman, Jules Labarthe, A E Johnson served as chairman, pro tem.

"Discussion was solicited upon the data forms already in use. These data forms are designed to carefully localize causes for consumer complaints and product failure. Mr Johnson explained in brief the reasons for this work.

"The National Institute of Rug Cleaning submitted a form for committee use, which applies to rugs and carpets. It was accepted with addition of three further fault categories: soiling, ease of soil removal and electrostatic charge build up.

"The Committee agreed that Lowell should call in any data accumulated by the middle of March. This data will be compiled into a single report and circulated to the members. The data would be presented anonymously. The Committee will then make decisions concerning publication of the results and frequency of compilation.

"The Committee recommended to TCR that Albert E Johnson be the new chairman to replace Jules Labarthe, whose term of office has expired."

COMMITTEE ON DETERMINATION OF ODORS IN RESIN-TREATED FABRICS——As chairman of the new Committee on Determination of Odors in Resin-Treated Fabrics, P J Fynn reported the following:

"The Organizational Meeting of this Committee was well attended by a number of people over and above the twelve members who responded to the original invitation to membership.

"One of the first suggestions was to the effect that the Committee's investigation not be limited to odors in resin-treated fabrics but be extended to all problems of odors in fabrics.

"A request for experience in methods of testing for latent odors brought forth five:

1) Steaming in a special steam tube.

2) Enclosure in a polyethylene bag.

3) Treatment with sodium carbonate solution, cold.

4) Treatment by immersion in warm sodium carbonate solution.

5) Elution of sample and titration of liquid to a color change for free formaldehyde.

"It was decided that the chairman would arrange to send, to all members willing to participate in a round-robin test, several procedures and all necessary apparatus and test fabrics for a comparison of three of these methods for detecting odors in fabrics. Fourteen laboratories indicated willingness to participate."

COMMITTEE ON COLORFASTNESS TO ATMOSPHERIC CONTAMINANTS——J M Straley, chairman, reported as follows:

"The major portion of the Committee's time has been devoted to study of the one-year's service trials on gas and "O"-fading. There seemed to be insufficient evidence that ozone is the culprit gas in those fadings not due to oxides of nitrogen. Six stations of testing were used and fadings were compared to the standard at four-, eight- and 12-months intervals. As expected, the location of the trial was the biggest variant. It is apparent that, aside from gas-fading (caused by oxides of nitrogen), a fading which can be more or less simulated by exposure to ozone also occurs. A further check on this fading will be run.

"Ozone generators for test purposes were discussed. Many of these are available, cost and speed being the two most important factors. No conclusions were reached here, further study being recommended.

"One of the members, Dr Salvin, reports the discovery of nonstaining substantive inhibitors for ozone fading in laboratory tests. These are nonnitrogenous compounds which are of little value as protective agents against gas fading.

"It is the consensus of the Committee that the method of rating gas-fading should be changed to conform with methods of rating other alternations in color. The new system would be based on comparisons to

the grey scale at cycle levels of gas exposure. In this manner, accurate transmittable values, capable of universal understanding, would be provided."

COMMITTEE ON WEATHERING OF TEXTILES——F J Rizzo, retiring chairman of the Committee, reported as follows:

"The attendance at this session was small and failed to produce a quorum. However, since this was the present chairman's final meeting in that capacity, it served both as a review of progress and to forecast future action.

"In the way of accomplishments, the Committee has reached a tentative decision on a calibrating medium for accelerated weathering equipment in respect to radiation but there are still major problems in its proper utilization. The specific means for accomplishing the necessary changes to make it effective are understood, but their effectiveness remains to be demonstrated.

"The work done to date shows: 1) that existing accelerated equipment will classify textile materials qualitatively, 2) that there are quantitative differences between machines, and 3) that some changes in operating conditions can be anticipated. It has been demonstrated that, in a qualitative way, accelerated equipment grade materials in the same way as exposure to the elements.

"For the future, the new chairman, L L Heffner will unquestionably recognize the following:

1) There are many analogies with problems primarily faced by the Committee on Colorfastness to Light as well as many problems peculiar to the specific program.

2) The need for establishing a standard weight of fabric for classifying materials.

3) The initiation of outdoor-exposure programs at a number of locations throughout the country as well as possibly throughout the world.

4) The importance of both substrate and finish in the final results.

5) The need for maintaining cognizance of the properties of test materials when first placed in test due to potential aging factors introduced by the period of experimentation.

"For the outdoor-exposure program anticipated, the Committee will require an immediate appropriation of $2500. It is requested that this be approved. Because of the nature of the problem, the Committee is faced with a problem of acquiring sufficient quantities of fabrics to assure reproducibility of test materials.

"The present chairman thus respectfully submits his last report and will insure that the new chairman, who was unable to be present, is adequately briefed so that work can proceed without interruption."

COMMITTEE ON STREAM SANITATION —— Chairman R H Souther submitted the following report:

"Further research during 1958 has been focused on finding more economical means of treating textile waste. A chief problem of textile waste research is to determine the most efficient method with the lowest treatment cost.

"The 'Laundry Waste Guide' and 'An Industrial Waste Guide to the Wool Processing Industry' have been distributed widely throughout the textile industry, and are available upon request to the U S Department of Health, Education, and Welfare. The 'Industrial Waste Guide for the Cotton Processing Industry' is now at the printers and should be available for distribution soon.

"The extent of interest in waste-treatment problems in the textile industry is reflected by the numerous requests for additional information and publication reprints that have been received from various sections of the United States and foreign countries.

"The following articles relating to waste treatment were published in *American Dyestuff Reporter* in the July 14, 1958 issue:

"Disposal of Combined Textile Finishing Wastes and Domestic Sewage," by George G Bogren, P473.

"Pollution Control of New England Interstate Waters," by Joseph C Knox, P477.

"Treatment of Mixtures of Textile Waste and Domestic Sewage," by R H Souther and T A Alspaugh, P480.

"Combined Treatment—Bleachery Waste and Domestic Sewage," by John L Brown Jr, P489.

"Other research and accomplishments in textile waste-treatment problems have been reported in various publications, namely, a liquid waste treatment plant of American Cyanamid Co, Bound Brook, N J; a new type activated sludge system at Hohokus, N J; and a Georgia Institute of Technology Process tested at Dundee Mills, Inc, Georgia.

"A paper on "Textile Waste Treatment Studies" was presented at the 13th Purdue Industrial Waste Conference, Purdue University, by R H Souther and T A Alspaugh of the Piedmont Section, AATCC. Data from this research have indicated excellent results in treating textile wastes can be obtained at a low initial cost by treating in aerated lagoons, with reduction in BOD up to 90% and better. It was reported that no sludge digestion is necessary and operating costs are one-fourth to one-half that of conventional methods. An abstract of this paper, published in *Textile World* (September, 1958) has brought forth numerous requests for additional information.

"In-plant methods of reducing textile wastes and toxicity effect of chrome, cyanide and ferrocyanide compounds on activated sludge are being studied by the Committee.

"At the December 1958 meeting of the National Technical Task Committee on Industrial Wastes, in Cincinnati, Ohio, the AATCC and the Textile Industry were represented by Percival Theel and R Hobart Souther. Prof Theel reports that his subcommittee is devoting its activities to determine needs and recommend methods for improving publicity and public relations. Mr Souther is chairman of the Subcommittee on Research Projects, which has the responsibility of assigning priority to fields for research study which may be awarded U S Public Health Research Grants in water-supply and water-pollution-control studies at various universities, federal and state agencies, and industrial research associations. This meeting was reported in *American Dyestuff Reporter*, January 12, 1959 (p35)."

COMMITTEE ON COLORFASTNESS TO WASHING——Chairman R B Smith reported for the Committee as follows:

"The test for washfastness of fabrics subjected to industrial laundering as now published in the *1958 Technical Manual* is limited to cotton fabrics. This limitation arose because it was necessary to carry out further tests to make the method satisfactory for all fibers and fabric-finishing treatments. This work has now been completed and the Committee has voted to rewrite the method to give it complete coverage. When this has been done, the new draft will be submitted to the Committee and then to TCR for its approval.

"There is now no AATCC washfastness test for the hand-wash level of colorfastness, but such a level washfastness is part of the specifications of ASA L-22 and L-24, and steps are to be taken to obtain fabrics (with fastness below level of the IIA Test) which will have reasonable fastness to hand washing. These will be subjected to hand-

washing tests by various members of the Committee and the resulting fabrics will be used as standards in the development of a laboratory test for colorfastness to hand washing."

COMMITTEE ON COLORFASTNESS TO LIGHT———J E Norton, chairman, presented the following report:

"The four subcommittees or task groups each held meetings on January 28 and the main committee met on the morning of January 29.

"Subcommittee I has completed all of the evaluations of the langley series of exposures made for 12 consecutive months at three locations. Taking advantage of the offer of the new Statistical Committee, the chairman met with this Committee to discuss a statisical analysis of the data from this exposure series. Plans are now in progress to complete this statistical analysis and prepare a paper for publication.

"Subcommittee II has about completed its selection and procurement of fabrics for its proposed interlaboratory test. In this test program, laboratory exposures under various conditions of exposure will be compared against both daylight and sunlight exposures. Before exposures are started, screening tests will be conducted at Chicago to determine the approximate fading range of each dyeing. The tentative proposed program will then be discussed with the statistical committee before starting the program.

"Subcommittee III held only an informal meeting since the chairman, Dr Salvin, was unable to be present due to an emergency which required that he leave New York. He did, however, leave a brief report of some work that had been done in which ozone generators had been added to the Fade-Ometer.

"Subcommittee IV has started collecting fabrics which will be suitable for use in interlaboratory tests on colorfastness to weathering. The Subcommittee will cooperate with a working group of the ISO and will study a new set of vat-dyed standards which have been proposed by the Swiss. Other possible standards, such as the plastic chip being used by D-20 of ASTM, will also be studied. Actual weathering tests at three locations will be started as soon as the materials and possible standards are available.

"The Lightfastness Committee recommends that some arrangement be made to obtain a stock of the ISO lightfastness standards which would be available for sale in this country."

COMMITTEE ON FLAMMABILITY OF CLOTHING TEXTILES——R C Geering, as retiring chairman, presented the following report:

"The Committee held three meetings during 1958. Interlaboratory tests and research work were done by the following laboratories:

AATCC Research Laboratories
Cone Mills Corp
Princeton Knitting Mills, Inc
Riegel Development Laboratories
U S Testing Co.

"Field tests were conducted with the cardboard holder method and the results compared with those obtained by the standard method. This method might be of advantage to laboratories which do a limited amount of flammability testing as it reduces the cooling time of the specimens and also the initial investment in equipment. It was found that, by eliminating the top plate of the stainless-steel frame while brushing, somewhat more severe results are obtained than with the standard method. The application of the cardboard holder must be limited since its use does not conform with CS-191-53, but it was felt that it may be useful for research or internal quality control work only. Further study is contemplated.

"The variation measured within the piece of border-line brushed rayon fabric was found to be within reasonable limits. Further work is advisable on pile preparation after drycleaning and washing to obtain better correlation among laboratories.

"Heat transferred through the back of the burning specimen was studied by the following means:

1) paper thermometers
2) fuseable yarns
3) radiation measurements.

No definite conclusions have been reached on this rather complex problem to this date and study is being continued.

"The commercial standard CS-191-53 has been brought up for revision by Mansfield Lonie, Commodity Standards Division, U S Department of Commerce. Our Committee feels that the standard has accomplished what it has set out to do, namely to eliminate the dangerous fabrics from the market as well as to make the manufacturers aware of the problem in general. In view of the above and the fact that no major improvements have been accomplished on the method and the equipment, the Committee recommends that the standard be continued without alteration.

"An NFPA proposal for a change in its own standard has been studied. This proposal suggests a radical change in method and equipment and required larger specimens. It also proposes a classification of fabrics according to their suggested end uses. Our Committee, upon review of the evidence submitted, believes that the conclusions expressed therein are not warranted. The Committee further feels the method in CS-191-53, which is the same as AATCC Standard Test Method 33-1957, Flammability of Clothing Textiles, adequately meets the requirements of the Flammable Fabrics Act.

"An exhibit illustrating the activities of the Committee was set up at the National Convention of the AATCC in Chicago, October 30th to November 1st by Cameron Baker and George Mandikos.

"A letter of encouragement was sent to TRI in behalf of its research program on a new flameproofing agent."

COMMITTEE ON DAMAGE CAUSED BY RETAINED CHLORINE———Chairman R F Aurich made the following report:

"The Committee on Damage Caused by Retained Chlorine had published in the January 12, 1959 issue of the *American Dyestuff Reporter* its new Tentative Test Method 92-1958. Although we feel that this test method is a more reliable method than previously on the books, and that it will give more reproducible results, we are still not satisfied, even with this method, on the reproducibility obtained between laboratories on fabric falling in the intermediate range of damage. To this end, therefore, the work of the various subcommittees, especially the Prewetting and Chlorination Subcommitte and the Rinsing and Scorching Subcommitte, is continuing. The Rinsing and Scorching Subcommittee is further exploring the effects of conditioning times, temperature in scorching, and other related variables in the rinsing and scorching steps of the procedure. The Prewetting and Chlorination Subcommittee is further investigating a buffering medium for the chlorination solution to arrive at the specified pH. In view of the importance of alkalinity per se or the total alkalinity of the chlorinating system as it affects chlorination results through rinsing and scorching, the Prewetting and Chlorination Subcommittee is also investigating the chlorinating bath with respect to possible specifications for alkalinity in the chlorinating medium. The Usage Subcommittee is continuing its work,

which has been extremely slow to date, in determining the degree of correlation existing between the results obtained by use of the test method and the damage sustained in actual home and commercial laundering.

"In the fall of last year, the Committee, in the course of an interlaboratory study, came upon the disconcerting situation wherein it was learned that our standard fabric had changed in susceptibility to chlorine-retention damage. This, of course, could be quite a setback time-wise to our program, inasmuch as the standard fabric had been specially prepared to give damage in the intermediate range since that is the range wherein we have the most trouble in reproducibility. Since it now shows a far higher degree of damage, in fact it is in the magnitude of damage on the high side wherein we do have reproducibility, the fabric is now of questionable value to us. Our Formulations Subcommittee is working on this problem to see what can be done. They are determining whether or not the fabric on hand can be restored to its previous level of damage or whether it will be necessary to further finish a new yardage with a formulation with less of a tendency to drift. This phenomenon that was uncovered is a rather new one and was the subject of several technical papers presented in the latter part of last year—one at the National Cotton Council and the other at our own AATCC Convention in Chicago. You can appreciate, of course, that it is quite unfortunate that our problems are further complicated by this previously unknown situation.

"Most of you are aware of the research project launched by the Piedmont Section on 'The Chemistry of Chlorine Retention by Resin-Finished Cotton.' Although there is a certain amount of parallelism in our work, the work of our Committee and that of the Piedmont Section Research Committee is not overlapping. Their project, as has been explained to us by Dr Wayland, who is in charge of same, is concerned with establishing basic information concerning the mechanism of chlorine retention; whereas we are, of course, concerned with establishing a suitable test method of realistically assessing chlorine damage as related to service. We have communicated with both Dr Wayland and Fred Fortess, chairman of the Piedmont Section Research Committee, extending our cooperation whenever they deem feasible; and feel that they might be able to render a service to us in the sense that, using our test method in various phases of their work, they may be able to give us a more intelligent appraisal of the merits of our new Tentative Test Method. We have received expressions of cooperation from both Dr Wayland and Mr Fortess; and toward this end, we are considering establishing liaison between our Committee and their project in order that we may both mutually benefit from each other's work."

QM-AIR FORCE DYE SURVEY COMMITTEE———W A Holst, chairman of the Council's QM-Air Force Dye Survey Committee, suggested that this Committee should come under the jurisdiction of the Technical Committee on Research as a reference committee. A motion was made and seconded that the Council be requested, through ECR, to discharge this committee and make it a reference committee under TCR with W A Holst as reference chairman. The motion was adopted.

COMMITTEE ON ANTISTATIC FINISHES———G R Thompson presented a request by the Committee that TCR approve the editorial changes made by the Committee in Tentative Test Method 76-1954, Determination of the Electrical Resistivity of Fabrics. A motion was made and seconded to this effect. The motion was adopted.

COMMITTEE ON IDENTIFICATION OF FINISHES ON TEXTILES ———G J Mandikos presented a reqest by the Committee that TCR conduct a letter ballot on the test method developed by the committee for the analysis of two finish categories (water repellents and wrinkle-resistant finishes). This material was circulated to TCR on July 24, 1958 as a status report for comments and suggestions. The reaction to this report has been highly favorable and complimentary. A motion was made and seconded that the method be sent out for letter ballot to TCR. The motion was adopted.

TEST FABRICS———W Klass reported that the International Organization for Standardization (ISO) had accepted the use of the Standard Six-Fiber Test Cloth in alternate test procedures.

COMMITTEE ON EVALUATION OF FINISHES FOR RESISTANCE TO STAINING AND SOILING——— H B Goldstein, chairman, reported as follows:

"As reported at the last meeting, this Committee has chosen to work concurrently on two problems.

"The task group under the chairmanship of Charles Zimmerman is concerned with that problem of soil deposition through laundering. This task group has conducted an interlaboratory series of tests in which a variety of fabrics of assumed variation in soil pickup were included. Based upon the preliminary findings of this task group, it appears that resin finishing normally does not accelerate soil pickup when a synthetic detergent is used. However, when soap is used, particularly in the presence of hard water, certain finishes do appear to cause an accelerated pickup of soil during laundering.

"Another factor of resin finish is that it appears to reduce the substantivity of fluorescent brighteners commonly used in household detergents. This task group contemplated additional interlaboratory tests to check out this factor, of the use of soap, as well as to check an additional factor of the presence of iron in wash water.

"The other task group, under the chairmanship of Hugh Bryce, is concerned with the evaluation of finishes for resistance to staining and soiling, and is particularly concerned with the development of a laboratory test procedure to evaluate the resistance of fabrics against oil-borne stains. This task group obtained a supply of fabric through the aid of the AATCC, and has finished a portion of same with a soil-resistant finish. The members of the task group have participated in an interlaboratory test to attempt to correlate some of the presently available test methods with ease of soil removal, as would be performed by the housewife. The data thus obtained has yet to be compiled and studied before any conclusion can be drawn.

"The meeting on January 28th was well attended and all present indicated great interest in both of these problems."

IMPROVED MECHANISM FOR APPOINTMENT OF RESEARCH COMMITTEE MEMBERS———Mr Sylvester asked Mr Mandikos to describe the newly designed application form which was developed to facilitate the procedure for appointing members of AATCC Research Committees and to enable the National Headquarters to maintain accurate records regarding committee members.

Mr Mandikos described the vari-

(*concluded on page 58*)

37th National Convention———

MODERN FINISHES FOR MODERN FABRICS*

S N GLARUM
Ciba Co, Inc

During the last 1-2 years the cellulose-reactive dyes have come into extensive use because of their brightness, excellent washfastness, and ease of application. These properties make these dyes of particular interest for "wash and wear" fabrics, which must be treated with durable finishes. Much work has been reported on the effects of such finishes on the older classes of dyes. This paper gives the results of studies of the effects of various types of thermosetting resins, catalysts, and processing conditions on the lightfastness of cellulose-reactive dyes.

INTRODUCTION

THE scientific achievements of the past decade have out-paced some of our wildest expectations. We are rapidly becoming accustomed to hearing about satellites being put into orbit about the earth, submarines that can cruise hundreds of thousands of miles under water without refueling, machines that can perform calculations in seconds that would otherwise require years, and we confidently expect that a rocket will be sent to the moon within a few weeks. These are indeed spectacular advances that receive widespread publicity.

The developments in the textile field, during this same period, may not have made as big headlines in the daily newspapers, but in their immediate practical aspects, they are much more important in our daily living. A very few years ago, if we had read about garments that, when soiled, could be put into a box for a few minutes and taken out clean, neat, and ready to wear, we would have thought we were reading science-fiction. Nevertheless, this is just what is being done today with the development of "wash and wear" garments. Clothing can be automatically washed, rinsed, and dried and come out neat and properly creased, ready to wear within an hour.

The term "wash and wear" has become part of our daily vocabulary. The work-saving implications are so attractive to the housewife that the term has become a magic phrase for promotional purposes. Unfortunately, no official performance standards have been established, and in many cases the expectations of the consumer have differed greatly from actual performance. The AATCC Committee on Wash and Wear continues its works on test methods for evaluation which should establish performance standards and eliminate much of the confusion.

There is a tendency to think of "wash and wear" performance only in terms of the mechanical properties of fabrics. However, satisfactory "wash and wear" performance depends on a number of factors, such as, fiber, fabric construction, dyes, and finishes. Because of cost, if for no other reason, cotton is the most important fiber for "wash and wear" goods. What little is known about the effects of construction is frequently outweighed by demands of style and buying habits. Thus the factors with which we are mainly concerned are dyes and finishes for cotton fabrics.

One of the major requirements of a "wash and wear" article is that it must have a neat appearance after washing and drying without ironing or with very little ironing. This requires that each fiber return to its initial position and shape. The hydrophobic synthetic fibers possess this property to a greater or lesser degree, but the natural fibers soften when wet and assume the shape in which they are dried. In order to impart recovery properties to the cellulosic fibers, it is necessary to treat them with durable finishes, the most prominent of which are the urea- and melamine-formaldehyde precondensates and reactive types of water repellents. Treatment of cellulosic fibers with these finishes makes them more resilient and reduces the moisture takeup. Thus the fiber has a much greater tendency to stay in place and retain its shape during laundering.

The appeal of the ease of laundering "wash and wear" fabrics is a big selling point, but ease of laundering alone is not sufficient to insure success. Color is the most obvious property to the buyer and user, and the performance of the dyes must be considered along with finishes in any evaluation of "wash and wear" fabrics. As cotton is the most important fiber for "wash and wear," the introduction of the cellulose-reactive dyes, with their high brilliance and excellent washfastness, has come just in time to fit in with the development of "wash and wear" goods.

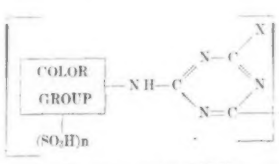
The properties of the dyes and the finishes cannot be considered independently as the two must work together to give the over-all performance that is required.

The importance of the effects of finishes on the properties of dyed fabrics has been well emphasized by the many papers that have been presented before this Association on this subject regarding the older types of dyes. Especially noteworthy is the Intersectional Contest work of the Rhode Island and Piedmont Sections (*1, 2, 3*) regarding the effects of resin finishes on direct and vat dyes.

The introduction of complete ranges of entirely new types of dyes requires new studies of the effects of finishes on these dyes. This is a report on the effects of some of the most commonly used durable finishing agents on the Cibacron group of reactive dyes on cotton. Many more papers can be expected on this subject as new reactive dyes are being developed rapidly and many new finishing agents are becoming available.

EXPERIMENTAL

CIBACRON DYES——Within the first six months of 1958 three excellent articles by Vickerstaff (*4*), Schlaeppi (*5*), and Fox (*6*) appeared in the *American Dyestuff Reporter* regarding the chemistry and mechanism of dyeing cellulose with the reactive dyes and there have been numerous articles in other journals. A typical structure for the Cibacron type of reactive dye is shown in Figure 1.



X = Inactive group or solubilizing group

Figure 1

*Presented during the 37th National Convention on October 30, 1958 at the Conrad Hilton Hotel, Chicago, Ill.

$$R - Cl + HO - Cellulose \xrightarrow[heat]{alkali} R - O\,Cellulose + HCl$$

Figure 2

Reaction with cellulose takes place in the presence of alkali and heat so that the dye combines chemically with the cellulose through an ether linkage to become an integral part of the fiber (Figure 2).

The articles mentioned above and the references cited may be consulted for further information on the reactive dyes and the methods of dyeing.

The dyeings for these tests were made on fully bleached, mercerized, 80 square cotton with the following Cibacron dyes:

Brilliant Yellow 3G
Yellow R
Brilliant Orange G
Scarlet 2G
Brilliant Red 3B
Rubine R
Turquoise Blue G
Blue 3G

These colors are so new that no *Colour Index* numbers have been assigned so it is necessary to use the trade names for identification.

The Thermofix method of dyeing was used for preparing samples for these trials. This consists of padding the dye on the cloth with urea and alkali, drying, curing and washing. All the dyeings were made using 2.5 ounces of dye per gallon of dyebath.

The dyeing procedure in brief was as follows:

Padding Bath
2.5 oz/gal dye
27.0 oz/gal urea
2.7 oz/gal soda ash

Thermofix Process
Pad at 140°F
Dry
Cure eight minutes at 285°F
Rinse
Soap 15 minutes at boil
Rinse
Dry

RESIN FINISHES——The resin finishes which were compared in these trials are widely used commercial products of four different classes which are popularly designated as follows:

1) Melamine resin	M
2) Urea-formaldehyde resin	U
3) Ethylenecurea resin	EU
4) Modified urea-formaldehyde resin	MU

The letters at the right are abbreviations which are used in Tables I and II and Figures 3 and 4. The simple urea-formaldehyde resins are not generally suitable for treatment of cottons, but it was of interest to include this type for comparison.

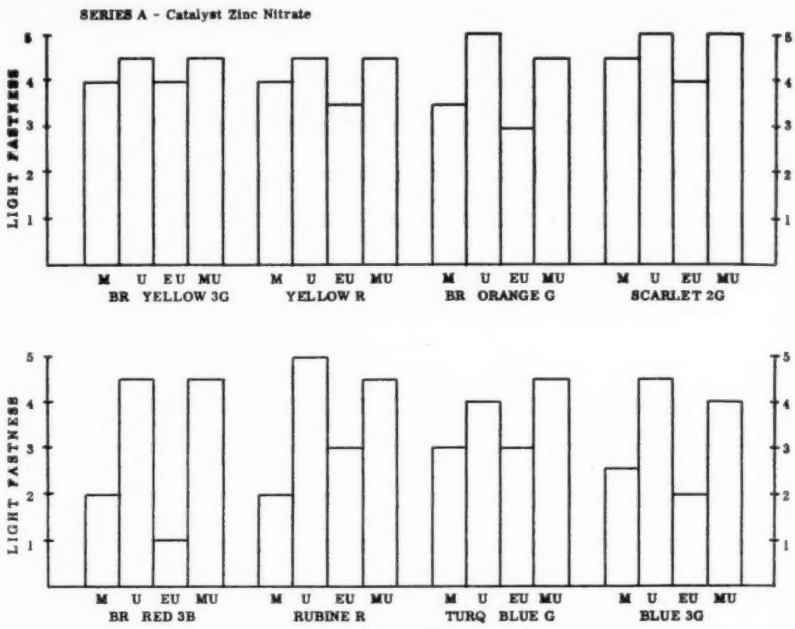


Figure 3

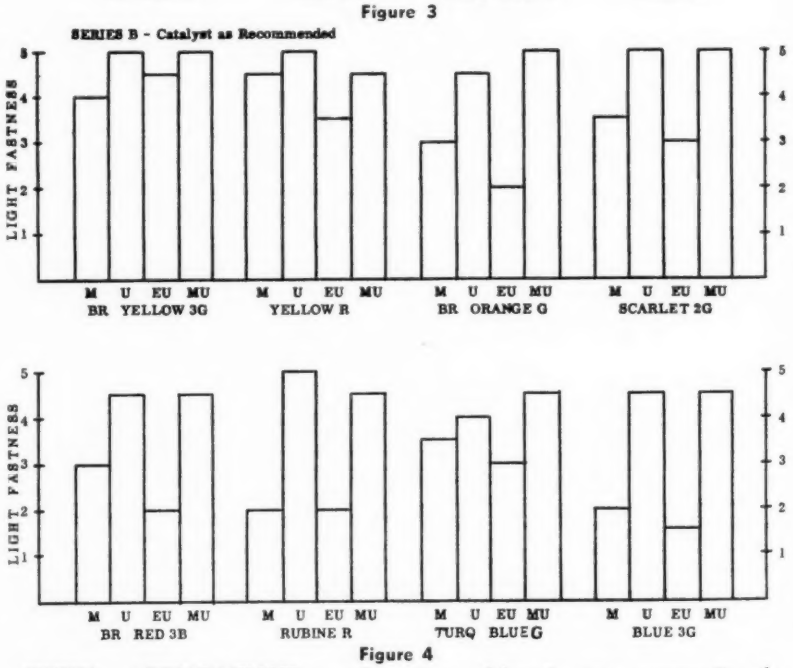


Figure 4

RESIN APPLICATIONS——In the first series of trials, the resin finishes of the four types listed above were all applied with a single catalyst, zinc nitrate, using seven grams per liter in the padding bath. As the resins are supplied at different concentrations, the amounts used were adjusted to apply about 5% of cured resin on the fabric, allowing for 70% pickup on padding. After being padded, the samples were dried five minutes at 225° F and cured for five minutes at 300°F. Following the common, although not necessarily the recommended, plant procedure, the fabrics were not washed after curing.

Samples of the treated, as well as untreated, fabric of each color were exposed in a Fade-Ometer until the untreated sample showed visible fading. The samples were then rated by several observers for the effect of each resin treatment on the fading of the dye. Ratings were made on a scale of 5 to 1, with 5 indicating no decrease in fastness and 1 indicating extreme fading. In all cases, the rat-

ings refer to the lightfastness relative to that of the untreated sample and do not provide a comparison of the fastness of the different dyes.

In a second series of trials, the resin finishes were applied with the catalyst as recommended by the supplier of the resin. The amounts of resin used and the treating conditions were otherwise the same as in the first series.

WATER REPELLENTS——In addition to trials with the resin finishes, different types of durable water repellents were applied to the Cibacron dyeings to determine the effects of these finishes on lightfastness.

RESULTS

EFFECT OF RESIN FINISHES——The ratings, after Fade-Ometer exposure, of the trials using zinc nitrate as catalyst throughout are shown in Table I and graphically in Figure 3. In the case of the Brilliant Yellow 3G, all the resin treatments reduce the lightfastness to a small degree, but the effects of the urea-formaldehyde and the modified urea-formaldehyde resins are less than that of the melamine and ethyleneurea resins. The same pattern is followed with all the dyeings with the urea and modified urea resins causing only small to no loss in lightfastness and the other resins having greater effects. The relative differences between the resins are much greater with some dyes than with others. Brilliant Red 3B, Rubine R and Blue 3G are greatly affected by the melamine and ethyleneurea resins while the urea and modified urea-formaldehyde resins still have only a slight effect.

Table II and Figure 4 show the ratings in a second series of similar tests using the catalyst recommended for each resin by the supplier.

The pattern of the results is the same with these catalysts as when zinc nitrate was used throughout. The urea-formaldehyde and modified urea-formaldehyde resins again show consistently less adverse effect on the lightfastness of the dyeings.

EFFECT OF CATALYST——With the melamine resin, changing from zinc nitrate to magnesium chloride as catalyst results in an improvement of 1 unit with one color, Brilliant Red 3B, and a decrease of 1 unit with one color, Scarlet 2G. Other differences are smaller and not consistent, so there does not appear to be any choice between these catalysts under these conditions.

Changing from zinc nitrate to an amine hydrochloride catalyst with the urea resin likewise did not show enough difference in results to be significant.

Using magnesium chloride in place of zinc nitrate with the ethyleneurea resin gave a decrease in lightfastness with four dyes, an improvement with two dyes and no change with two others. While this indicates that the catalyst may have more effect on lightfastness with ethyleneurea resins than with the other types tested, more extensive tests are required before any conclusion can be drawn.

EFFECT OF WATER-REPELLENT FINISHES——The durable water repellents make up a second group of finishes which are important for satisfactory "wash and wear" performance. The effects of five commercial durable water repellents were tested to determine their effects on the lightfastness of the Cibacron dyes on cotton. These included an emulsifiable silicone, an alkyl pyridinium compound, two modified resin emulsions, and a solid modified resin type.

These were applied to cotton fabrics dyed as described previously with the Cibacron dyes listed. Each water repellent was applied and aftertreated according to recommendations in the literature of the manufacturer.

The differences in the results of exposure tests in the Fade-Ometer were pleasantly insignificant in most cases. Only one of the water repellents tested showed any marked effect on lightfastness. This was a modified resin-emulsion type of water repellent which reduced the lightfastness of all the dyes tested by 1 to 2 units on the scale previously described. The other durable water repellents showed no effects of any significance.

TABLE I

Effect of resin finishes on lightfastness (Zinc nitrate as catalyst)

Dye	Resin M	U	EU	MU
Brilliant Yellow 3G	4	4–5	4	4–5
Yellow R	4	4–5	3	4–5
Brilliant Orange G	3–4	5	3	4–5
Scarlet 2G	4–5	5	4	5
Brilliant Red 3B	2	4–5	1	4–5
Rubine R	2	5	3	4–5
Turquoise Blue G	3	4	3	4–5
Blue 3G	2–3	4–5	2	4

TABLE II

Effect of resin finishes on lightfastness (Catalyst as recommended by resin manufacturer)

Dye	Resin Catalyst: Amine $MgCl_2$	Amine HCl	$MgCl_2$	Zn $(NO_3)_2$
Brilliant Yellow 3G	4	5	4–5	5
Yellow R	4–5	5	3–4	4–5
Brilliant Orange G	3	4–5	2	5
Scarlet 2G	3–4	5	3	5
Brilliant Red 3B	3	4–5	2	4–5
Rubine R	2	5	2	4–5
Turquoise Blue G	3–4	4	3	4–5
Blue 3G	2	4–5	1–2	4–5

CONCLUSIONS

We are, without doubt, going to see many new developments in finishes for "wash and wear" goods Nevertheless, the dyer or finisher is concerned with how he is going to process the goods in his plant right now. For producing optimum "wash and wear" performance of cotton fabrics with products now in general use:

1) The cellulose-reactive dyes, such as the Cibacrons, offer brilliance, washfastness and lightfastness not obtainable with other classes of dyes.

2) The alkyl modified urea-formaldehyde resins offer the means of obtaining the required mechanical properties with minimum adverse effects on the lightfastness of the Cibacron dyes.

3) A wide range of durable water repellents can be used to impart hydrophobic properties. Only one of five types of durable water repellents tested caused an appreciable adverse effect on the lightfastness of the Cibacron dyes.

As indicated previously, the "wash and wear" field is in a state of rapid development. The introduction of new dyes and new finishes will make necessary continued investigation of the effects of one on the other. However, it is hoped that the results presented here will be of some help in answering the problems of today.

ACKNOWLEDGMENT

Thanks are due to various members of our laboratory staff who made the dyeings and assisted in treating and rating the samples, and particularly to George Shoemaker, who supervised the finishing and testing.

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Western New England Section———

AN ADVENTURE IN RESEARCH
The Development of a "Wash-Wear" Finish*

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Warwick Chemical Div
Sun Chemical Corp

There is very little mysticism involved in the workings of a research laboratory. With a goal clearly defined, the development of a commercially acceptable product involves a combination of creativeness, intuition, and a great deal of hard work. When mixed in the correct proportions, these ingredients can combine to lead a research group on a trail of high adventure.

This paper describes some of the aspects of a journey into research on the problem of a "wash-wear", chlorine-resistant finish: the background and preparations, the program, and the outcome.

INTRODUCTION

IN reviewing various topics which might be of general interest to this group, I kept coming back to the problem of "wash-and-wear".

I realize that a great deal has been said and written about "wash-and-wear" in the past year or so, and I wish to avoid being repetitive. However, insofar as the cotton industry is concerned, the "wash-and-wear" treatment is undoubtedly the largest single sales stimulant that has come along for some time.

Because of its importance, I will talk about "wash-and-wear"; however, I shall depart from the usual presentation, and instead outline briefly and chronologically the creative and development processes which were involved in bringing forth a unique, chlorine-resistant, "wash-and-wear" finish.

Some of the information which I shall present, I may have to oversimplify in order to save time. As you know, a research laboratory is very much like a growing tree; branches of new knowledge and new developments cannot take place without having the prior development of the main trunk. The main trunk of the research tree is, of course, the backlog of know-how which is accumulated from the inception of the laboratory. The probability of developing new branches of knowledge depends to a great extent on the strength and volume of this reservoir of previous knowledge.

With this in mind, let us look into the creative and development processes which were involved in this specific line of endeavor.

Eight or nine years ago, certain representatives of the cotton industry felt that the newer synthetics could be given a run for their money if satisfactory crease resistance could be imparted to cotton fabrics *(1)*. However, with the limited range of finishing chemicals available and with the narrow finishing concepts in vogue at that time, this opinion was somewhat optimistic. Not much success was found in stopping the inroads of synthetics into established cotton markets until it was recognized that mere crease resistance was not enough. Certain other desirable properties were also necessary, such as freedom from excessive mussiness during wear, rapid drying, and reduction in the care required after laundering. It was with these primary goals in mind that the "minimum care" or "wash-and-wear" finish was evolved. It cannot be said that any one individual or organization was primarily responsible for the development of this concept; instead, the development originally was merely an outgrowth of the already-established practice of developing crease resistance on cotton fabric by means of thermosetting resins. The "wash-and-wear" treatment simply went one step further and applied sufficient resin so as to yield a fabric having a high level of crease resistance and having a strong tendency to present a satisfactory appearance after laundering, even with little or no ironing.

Warwick Chemical, among others, for many years had been supplying resins to the textile industry which were used for the crease-resistant finishes on cotton as well as for certain other treatments, such as the Everglaze processes.

As our customers became more and more interested in the "wash-and-wear" finishes, we undertook to review in our laboratory the information which was then known, in order to decide whether a program of development specifically aimed at the development of a superior "wash-and-wear" finish would be in order. After lengthy consultations with our sales force and a number of our customers, and falling back upon our reservoir of knowledge in this field, we were convinced that the most logical approach to this problem would be to break down the problem into two separate ones: namely, "wash-and-wear" finishes on cotton, and "wash-and-wear" finishes on rayon and other synthetics.

There is a considerable degree of similarity in these two problems, and yet, because of certain basic differences in the physico-chemistry of synthetic fibers as compared with cotton, some differences exist in the chemistry required for the solution to them. In our laboratory, we decided to study these goals as independent but overlapping problems. For the purposes of this paper, because of time limitations, I shall cover only our work on cotton.

REQUIREMENTS OF "WASH-AND-WEAR" FINISHES ON COTTON

What is required for a wash and wear finish on cotton? Although it may be self evident to you, it is surprising how many people neglect the fact that such a fabric must be washable. In other words, it must be possible to wash the fabric in a manner consistent with normal practice of the housewife. Obviously, then, such "wash-and-wear" finishes on cotton must be permanent to multiple launderings, they must be resistant to degradation from chlorine bleach, and they must not accelerate soil retention during laundering.

As a second but equally important characteristic of such fabrics, the garments made therefrom must be wearable. Included among the specific re-

*Presented before the Western New England Section on September 26, 1958 at Cavey's Restaurant, Manchester, Conn.

quirements which will give good wearing properties would be: good appearance after laundering with little or no ironing; freedom from excessive mussiness during wear; good strength retention (ie, good retention of tensile, tear, abrasion, and seam strength); and finally, the fabric must not be unduly affected by exposure to light (ie, the dyestuffs must be reasonably fast, and in the case of whites, they must not yellow as a result of exposure to light).

After defining these goals and outlining these specific requirements, we then turned to a more intensive study of the chemistry and physical properties of cotton fiber and of cotton cloth to determine which specific characteristics of the fiber might best be exploited and which characteristics could be expected to give us trouble.

Without attempting to give a complete listing of these various properties of cotton, I can describe a few of the more important properties and their implications.

CRYSTALLINITY OF THE FIBER ——Cotton cellulose is known to have a high degree of crystallinity, generally with between 80 to 90% of the cellulose in crystalline form. The crystallites in cotton occur in bundles, which are oriented in spirals around the principal axis of the fiber at an angle to that axis which may be from 20 to 50 degrees, depending upon the variety and type of cotton. Natural cross-linking of adjacent cellulose molecules is non-existent; instead, the crystallites result in close molecular packing, which develops relatively strong forces between the molecules and, thus, restricts their freedom of movement.

STRESS-STRAIN CHARACTERISTICS AND ELASTIC RECOVERY ——The intermolecular forces between the cellulose molecules are probably of the hydrogen-bonding type of van der Waals forces. Thus, when sufficient stress is applied to cotton fiber to overcome these intermolecular forces, the extensibility of the fiber will be of the nonrecoverable type. Those groups in the cellulose chain, which have been under strain, shift and form new attractive forces to adjacent groups in the strained position, relaxing the stress to the primary valence bond of the chain. Therefore, when the stress on the entire system is released, the adjacent molcules do not return to their former positions, and the fiber does not recover from its extension. In other words, the cotton fiber has poor elastic recovery. It is primarily this property which is responsible for the poor crease-recovery properties of natural cotton.

FIBER STIFFNESS——Natural cotton fiber is usually quite soft and pliable. Effective creaseproofing agents normally increase the stiffness of the cotton fiber considerably. The stiffness of the individual fibers has a strong influence on the manner of behavior of the fiber bundle (or yarn) when the yarn is subjected to creasing stresses (*2*). Not only will the stiffer fibers better resist such creasing stresses, but also, in the formation of a close fold in the fabric, stiffer fibers can more readily adjust themselves to a position of minimum distortion than can limp fibers. It should be noted that, while an increase in fiber stiffness will improve resistance to fabric creasing, at the same time the higher modulus may result in a fabric with less capacity for energy absorption, and consequently, lower the resistance to abrasive and tearing forces.

MOISTURE ABSORBING AND SWELLING PROPERTIES OF CELLULOSE——Natural cotton has the ability to absorb a considerable amount of water. At approximately 65% relative humidity at 70° F, the fiber will hold approximately 8-9% of moisture. At higher temperature and humidity, the absorbed water will be considerably higher. Although the mode of its action is by no means certain, there is good reason to believe that the water molecules become associated with the cellulose molecules so that intermolecular forces are neutralized or at least substantially weakened (*4*). The extensibility of the fiber is increased as it absorbs water. The water, by swelling and opening up the fiber structure, appears to act as a lubricant, thus permitting better movement of the fiber molecules. This property also influences crease recovery, and it can be expected that any treatment which will reduce the tendency of the fiber to absorb water will also improve the extensibility-recovery properties and, thus, the crease-resistant properties. Also, if the moisture absorbing property can be reduced, the rate of moisture release might simultaneously be increased. This effect might speed up the drying time of the treated fabric.

With our goals established, and with a clear picture of the chemistry and physical properties of the cotton fiber in mind, we were about ready to give thought to development of materials which would yield the desired results.

Previous work in this field invariably involved the use of materials which compromised one or more desirable properties for the attainment of limited beneficial effects. For example, the use of ordinary urea-formaldehyde resins gave fairly good crease resistance and resiliency, but the finish suffered very badly from chlorine damage, and even in the absence of chlorine, the washfastness of the finish was not particularly good. Melamine-formaldehyde resins behaved in the same general way except that the washfastness was considerably better. Methylol derivatives of cyclic ethyleneurea provided good crease resistance and resiliency; the washfastness was satisfactory, and the chlorine resistance was also satisfactory when the treated fabric was tested initially; however, after the fabric was washed several times, especially in hot alkaline laundering or after souring, the chlorine damage increased to the point of unsatisfactory performance.

At the other extreme of chemical types used for creaseproofing fabrics, the nonnitrogenous materials, such as ketone-aldehyde resins, acetal derivatives, and formal derivatives, showed relatively good fastness to laundering, absolutely no chlorine retention, but the crease resistance levels obtainable with these compounds were considered inadequate to produce "wash-and-wear" effects. As you well know, there are almost an innumerable list of variations of these types of compounds, many of which have been and are being used on textiles. Each has its advantages, and each has its shortcomings.

Using the chemistry of these compounds as a basis for further exploration, we had to decide on some general concepts to guide us in the development of new and more useful compounds. Some of the considerations which carried heavy weight are the following:

1) For some reason which was not fully understood at that time, the presence of nitrogen in the compound appeared to be beneficial from the standpoint of crease resistance and/or resiliency. All of the nonnitrogenous materials known gave insufficient crease resistance and resiliency.

2) The presence of nitrogen in the molecule need not, per se, cause chlorine damage. We were convinced that the chemical structure of the compound had a profound effect on whether or not the nitrogen would retain chlorine and whether or not such retained chlorine would cause damage. In com-

pounds such as urea-formaldehyde and melamine-formaldehyde resins, the free hydrogen atoms on the amido or amino groups cause the retention of the chlorine. When such chlorine-containing resins are heated, as when the resin-treated fabric is pressed, the chlorine is liberated as HCl, which causes very severe discoloration of the fabric and very severe degradation in strength. With methylol derivatives of cyclic ethyleneurea, there are no hydrogen atoms on the nitrogens; that is, both nitrogens are tertiary in nature, and as such, do not retain appreciable quantities of chlorine. However, the cyclic ethyleneurea structure is apparently not sufficiently stable to withstand the hydrolytic effects of hot alkaline laundering or even acid souring. As a result, the ring gradually ruptures when the fabric is subjected to the hydrolytic effects, exposing nitrogen atoms of secondary and primary nature, which can, indeed, absorb substantial quantities of chlorine and which can cause degradation of the fabric. We felt that a useful compound might be developed which would contain nitrogen atoms, provided all nitrogen atoms were tertiary and provided the molecular structure was stable under the various environmental factors to be encountered.

3) In order to obtain maximum fastness and maximum crease resistance and resiliency, we felt it would be necessary to have a compound which would be essentially monomeric in nature; in this form, the low-molecular-weight material would be able to penetrate into the fiber structure and would not remain as a surface deposit on the exterior of the fiber. Any substance which tends to form continuous films and, thus, coat the fiber surface will have a cementing effect between fibers; this will reduce the multifilament character of cotton yarn and will thus aggravate the creasing phenomenon.

4) As opposed to extremely low-molecular-weight monomeric materials, we also felt that consideration had to be given to the nature and size of the crosslinking group. We knew that excessively short crosslinking groups, such as formaldehyde or glyoxal, tended to cause excessively severe deterioration in certain physical properties of the fiber and of the woven fabric, such as loss in abrasion resistance and tear strength. Thus, while we desired a molecular size small enough to diffuse into the interior of the fiber, we still desired to have a relatively large crosslinking group.

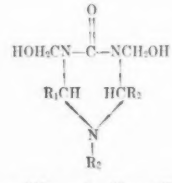
5) As an additional factor, we felt that a bifunctional reactant would be most effective in maintaining maximum tear strength and abrasion resistance. It had been our experience that polyfunctional compounds which are capable of resin formation are more likely to cause degradation of tear strength and abrasion resistance than are simple bifunctional materials which act primarily through their cellulose crosslinking effects.

Additionally, or course, any compounds which would prove to be commercially acceptable would have to have certain other inherent properties, such as little or no yellowing effect on white fabrics, minimum effect on the lightfastness of dyestuffs, and minimum tendency to absorb soil during laundering. To a very considerable extent, each of these latter properties, we felt, was also tied up closely with the specific nature of the crosslinking molecule, and especially with regard to the role of any nitrogen atoms present in such molecules.

Accepting these broad principles for the chemical structure of our idealized compound, our laboratory undertook to prepare and to evaluate a large variety of nitrogen-containing compounds which would fulfil, in as many ways as possible, the general description outlined earlier.

Several brand-new families of compounds were synthesized and studied; also, a number of compounds which had been studied several years previous by our laboratory were again dusted off and re-evaluated in the light of current requirements.

Two classes of compounds were discovered, which had remarkable combinations of properties to fulfil our goals. One of these is the triazone family of reactants, which is typified by Permafresh LCR, a dimethylol-substituted triazone. The general chemical structure of these triazones is as follows:



R_1, R_2, and R_3 may be alike or different; may be H, alkyl, or aryl

It will be observed that all of the nitrogen atoms are tertiary; furthermore, the ring structure comprises alternating atoms of carbon and nitrogen with a total of six atoms, which provides a compound of great chemical and thermal stability.

Literally hundreds of different members of the triazone family are possible. In our laboratory we have prepared a great number of the most promising. Based on this experience, it became readily apparent that not all members are equally effective in all respects. Depending upon the nature of the substituents present, there is considerable variation in the degree of chlorine retention, of scorch resistance, of odor development, and of washfastness.

The properties to be described for triazones apply only in a general way to the class as a whole. More specifically, the properties to be described refer to one or two particular triazone compounds which have been found to display the optimum combination of useful characteristics.

PROPERTIES OF SELECTED TRIAZONES

When applied to cotton, these selected triazones give excellent "wash-and-wear" properties; furthermore, they show rather extraordinary relationship between tear strength, abrasion resistance, and crease resistance. In addition, the relationship between tensile strength and crease resistance is usually more favorable than with other available resins.

The selected triazones show no chlorine damage on the initially treated fabric, nor does the chlorine damage increase on multiple alkaline launderings nor after acid souring. Figure 1 shows the comparative chlorine resistance of a triazone treatment as compared with a typical dimethylol cyclic ethyleneurea treatment.

Obviously, as the finished fabrics are subjected to laundering, the chlorine resistance of the triazone finish is essentially unaffected whereas the chlorine resistance of the ethyleneurea finish deteriorates substantially.

Aside from natural losses in strength due to chlorine bleaching, it is interesting to note that the triazone finish is also stable from the standpoint of color, and it does not have a tendency to become yellow on repeated exposure to bleach. Figure 2 shows the comparison of a triazone finish with a hexamethylated methylol melamine, and shows the

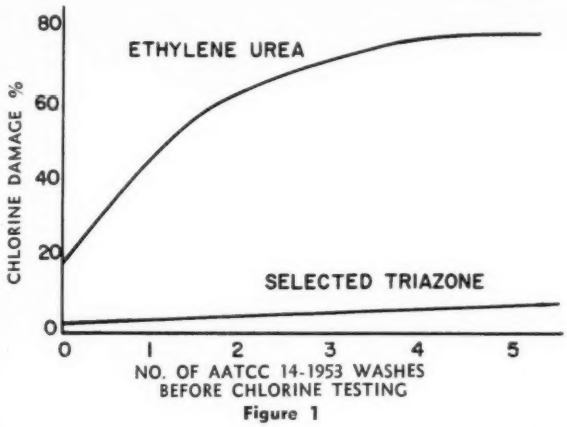


Figure 1

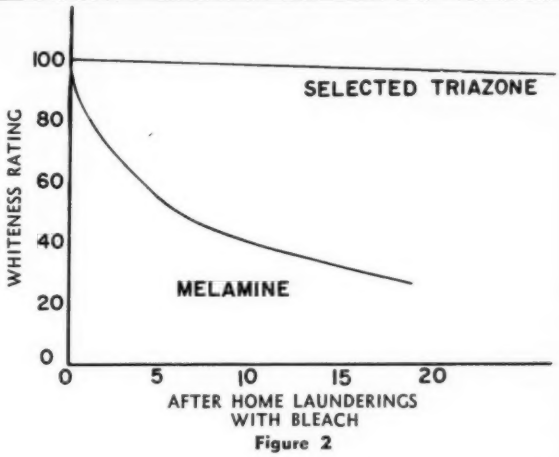


Figure 2

effect on whiteness when treated fabrics are subjected to twenty home launderings including the normal use of bleach. The whiteness values were determined with a Photovolt Photo-Electric Reflection Meter using the 610-Y diffuse reflection search unit with a blue filter. The instrument was operated with zero suppression, calibrating the scale so that a reading of 20 was obtained with a standard calibration plate having an absolute whiteness of 80% as compared with a freshly prepared surface of magnesium oxide.

The tendency of the fiber to swell and to absorb water is greatly reduced by the triazone finish. As an example of the practical effects of this phenomenon, one can cite the results of one test wherein shirts made from treated cotton and untreated cotton were processed in a domestic washing machine including the spin cycle. Determination of moisture content on these garments after the spin cycle showed that the untreated garment contained about 55% water, whereas the treated garment contained only about 34% water. When hung up to dry, the treated garment felt dry to the touch in approximately one-half the time required for the untreated garment.

The triazones show less adverse effect on the lightfastness of various dyestuffs, such as D and D's or the new reactive-type dyestuffs.

The triazones do not pick up soil during laundering.

The selected triazones are relatively easy to apply; they are not particularly sensitive to curing conditions. The only precaution which need by taken is to thoroughly afterwash the treated fabric to eliminate the byproduct odors which form during curing. Once removed, these odors will never return. Although all triazones produce some odor on the fabric after curing, there is considerable difference from product to product in the ease with which the odor can be removed in the afterwashing. This is an extremely important factor in the selection of a triazone compound.

The selected triazones are afterwashed satisfactorily by processing either in rope form or in open width through a multiple compartment washer in which the first few compartments are charged with sodium perborate and soda ash and the rest of the compartments are overflow rinses.

Triazones normally produce a relatively soft hand on cotton. The hand may be varied as desired by the addition of appropriate softeners or firming agents. Naturally, in the choice of such additives, consideration should be given to their chlorine-resistance properties. Suitable softeners include certain cationic agents, such as Permafresh Softener 355 and polyethylene softeners, such as Permafresh Softener PE.

The selection of a softener to produce optimum effects will depend on the requirements of the specific finish desired. Suitable firming agents include hydroxyethyl cellulose or polyvinylalcohol. However, it should be cautioned that the use of an excessive amount of stiffening agent will invariably result in a reduction of crease resistance. Normally, when a stiffening agent is included in the treatment, it is applied at the same time as the reactant. When softeners are included in the finish, they may be applied at the same time as the reactant, or preferably, they may be applied as a top softening after the washing treatment. It should be mentioned also that bluing agents, such as the conventional pigment bluing or the fluorescent type, may be added if desired. However, fluorescent brighteners should be selected with care to be sure that they are compatible with the reactant-catalyst system.

Inasmuch as the triazones react with cellulose only under acid conditions, it is necessary to have present during the curing a substance which will provide adequate acidity. Naturally, the choice of the catalyst must be such that it does not provide an excessive amount of acidity lest the cellulose be degraded. Our studies of cellulose reactants have always been closely tied in with concurrent studies of substances which might have catalytic activity for them. We have found that optimum performance of even the selected triazones is obtained only by the use of specially designed catalysts.

Bringing a product such as Permafresh LCR into the market and having it applied to fabric was an act of considerable satisfaction to our laboratory, as you can well imagine. It was not long, however, before our laboratories started getting reports from our salesmen that one thing or another was wrong with our finish.

In looking into these various complaints, we generally found that our product was not at fault. Instead, we found that many difficulties, which might at first appear to be due to the finishing compound, were actually due to some other factor, such as fabric structure, fabric prepare, etc. Indeed, it is a sad fact that "wash-and-wear" is not simply a function of the finish, but is an appropriate combination of the proper fabric construction, proper handling of the cloth prior to finishing, proper finishing technique, and finally, the correct fabrication of the cloth into the garment.

Because all of these factors (3) are of such importance to provide the consumer with a satisfactory "wash-

and-wear" garment, I would like to dwell on some of these points very briefly.

OTHER FACTORS INFLUENCING WASH-AND-WEAR

FABRIC STRUCTURE——Although this factor is of considerable importance, and must not be neglected, I shall have to omit a discussion on this because of the lack of time.

PREPARATION OF FABRIC PRIOR TO FINISHING——The fabric which is to be finished must be clean and absorbent. The fabric should be essentially free of the ordinary sizing materials, and any alkalis which have been used during the preparation of the fabric (boil-off, mercerizing, bleaching, dyeing, etc) must be thoroughly neutralized and rinsed out.

Any starches which are left in the fabric due to improper desizing will interfere with the penetration of the reactant into the cellulose fiber, and this will result in lower crease resistance and decreased washfastness. Also, residual starch will frequently retain considerable chlorine and will, thus, downgrade chlorine-resistant finishes.

On fabrics which are normally "loom finished," such as denims which are woven from a dyed warp yarn with an undyed filling yarn and chambrays which are woven from dyed warp and filling yarns, best results can be obtained only if such fabrics are properly desized before finishing. In the case of any such fabrics where a relatively firm hand is desired, the removal of the starch is compensated for by the use of stiffening agents, such as polyvinyl-alcohol or hydroxyethyl starch, in the finishing bath. The limited use of polyvinylalcohol or similar materials in the finishing bath will produce the necessary firmness without interfering with the proper effect of the cellulose reactants.

Inasmuch as all of these reactants require relatively strong acid conditions during the curing step, the presence of any residual alkali in the fabric seriously interferes with the catalytic effect of the catalyst used. Consequently, it is of utmost importance to properly rinse the fabric and sour it if necessary so as to reduce the pH of the fabric to approximately 7 or lower. However, it should be pointed out that merely souring the fabric without proper rinsing simply neutralizes the alkali, leaving excessive amounts of water-soluble salts, which indicate a satisfactory pH on the cloth but nevertheless provide a buffering effect, which prevents proper curing. Thus, in addition to checking the pH of the cloth, it is often of value to check the total alkalinity of the cloth by titration. It is a widely established practice in this country to reduce the total alkalinity in the fabric to a value of less than 0.05%, expressed as NaOH.

On fabrics which have been printed, the choice of the printing thickener must be made with care so that the printing thickener may be properly rinsed out without detracting from the quality of the print. If excessive amounts of the printing thickener are left in the fabric, it will be found that the performance (such as crease resistance) of the fabric will vary from the printed areas to the unprinted ground.

APPLICATION OF FINISH——A padder should be used which can provide deep, uniform impregnation of the solution into the fiber and which will eliminate surplus treating liquor from fiber interstices.

If the treating bath does not penetrate to the interior of the fiber, and an excessive amount of material remains between the fibers, the treated fabric will be inferior because of relatively poor crease resistance, higher stiffness, and greater losses in tear strength and abrasion resistance.

After impregnation, the fabric is dried, usually on a frame. During drying, warp-wise tension should be kept to a minimum, and the fabric should be framed somewhat over the desired finished width to compensate for relaxation shrinkage.

One other important factor to be considered during the drying step is the temperature to which the fabric is exposed. With ordinary hot-air-type drying chambers, care should be exercised not to expose the wet fabric to temperatures in excess of 260°F, at least until the fabric is essentially dry. If higher drying temperatures are used on the wet fabric, there will be a tendency for the cellulose reactant and other finishing agents to migrate to the surface of the fiber, which will cause a lowering of the crease resistance, a decrease in tear strength and abrasion resistance, and an increase in the amount of dusting on the treated fabric. With special types of dryers which utilize superheated steam at high velocities, such as the Dungler machine, less danger or migration exists with the use of higher drying temperatures.

Drying cans should never be used for the drying of reactant-treated goods because this method of drying will cause an excessive amount of migration. Drying cans are also highly objectionable because their use often results in an excessive amount of warpwise tension, which makes it difficult to finish the goods with satisfactory shrinkage control in the warp direction.

Depending upon the layout of the finishing plant, after the drying step, the processing may continue without interruption by running the fabric directly to the curing chamber; or, in some cases, after drying, the fabric may be plaited into a box or rolled up on a shell in order that it can be transported to the curing unit. In such cases, the fabric should be cooled by "skying" or by running over a chilled roll. This is to prevent batching-up the hot fabric, which might cause overcuring.

In any event, the fabric is cured in appropriate equipment, which will provide the necessary temperatures for the required amount of time. Naturally, the specific times and temperatures needed in any given case will depend upon the weight of the fabric, the temperature of the fabric as it enters the curing chamber, the efficiency of the curing unit, and the specific finishing agent being cured. Usually tests must be run in the plant to determine the optimum conditions for curing.

Again, following the curing operation, the hot fabric should be cooled down by skying or by passing over a chilled roll if the fabric is to be allowed to stand before the next operation.

Usually the cured fabric is given a washing followed by a thorough rinsing to remove the catalyst and any unreacted chemical or byproducts. This afterwashing operation is desirable because it eliminates the danger of odor development in the fabric, reduces danger of dermatitis to the wearers of the treated fabric, and generally improves the hand of the treated fabric. Generally, the washing operation is done in a continuous open-width multicompartment washer in which the detergent, perborate and alkali are used in the first few compartments, and then pure water rinses are used in the last few compartments. Following the afterwashing operation, the fabric is again "framed" to the final desired, finished width, and given any dry-finishing operations desired, such as compressive shrinking, calendering, etc.

(*concluded on page 55*)

Northern New England Section———

CHEMICALS FOR NONWOVEN FABRICS*

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INTRODUCTION

AT the present time, the status of nonwoven fabrics is clearly defined in numerous established applications. It is not difficult to stimulate a discussion on the growth potential of nonwoven fabrics; however, as both producers and consumers are aware, this is an existing commodity which presently offers the industry a new tool with present utility as well as growth potential. Nonwoven fabrics are no longer restricted to the low-priced, paper-substitute, disposable category. A diversified line of bonded products is now being manufactured and each of these separate items fulfills an individual need. Chemical suppliers, fiber producers and manufacturers alike are constantly endeavoring to improve upon and even further diversify existing products with anticipation that the improvements of today will become the new products of tomorrow. For example, the extension of nonwoven fiber products into the outerwear trade has frequently been discussed. Should this field materialize, it should be emphasized that growth into this area will be the result of the success of the existing products which established the groundwork for continued expansion.

DISCUSSION

Just what then does this complex mixture of fiber and resin offer? The nonwoven fabric used in interlinings and interfacing provides excellent wrinkle resistance and subsequent recovery for the garment or fabric to which it is providing support. When properly engineered, these fabrics offer durability comparable to the woven fabric itself. When used as a reinforcement ingredient for suitings, dress goods, shirtings, etc, the integrity of the fabric must obviously be maintained during the life of the garment.

In many fields, nonwoven fabrics capitalize on the elasticity and resilience they offer. Versatility is provided with regards to porosity, a specific varying need for industrial filters. The strength obtained with bonded fabrics can be varied by numerous modifications in the structure; namely, denier and staple length of the fiber, bonding agent, etc. The inherent nature of the fabric often makes it quite receptive to top coatings of vinyl, nitrocellulose and other finish coatings, since many bonding agents impart the same properties required of anchorage resins on woven fabrics. The rigidity or resilience which may be imparted to bonded fabrics is of great utility to the shoe trade in the fabrication of the insole and toe structure. The absorbency which may be obtained is a key factor in absorbent pads, personal items, surgical dressings, as well as chamois and wiping cloths. In each of these applications, as well as in others, additional merchandisable features are offered in the end use

A great deal of research and development effort has been expended by the chemical industry in an attempt to satisfy the requirements of many of the newly developed nonwoven fabrics. This paper deals specifically with the considerations essential for the development of existing and new bonding agents utilized in this industry. Specific examples are illustrated and emphasis placed on the improved varieties which may be necessitated.

SYNTHETIC POLYMERS——The manufacture of the multitude of nonwoven fabrics is unavoidably preceded by a detailed and completely necessary engineering program. Determining an intricate balance between fibers (both cellulosic and synthetic) and resin leads to many complexities. This discussion will emphasize principally the available chemicals utilized today, their inherent advantages and disadvantages, formulations, and areas of required growth. The selectivity of bonding agents and numerous auxiliaries is of even greater importance in this industry than in the conventional woven flat goods trade. The failure of one or more of the chemicals utilized will result not only in optical defects, shrinkage variations, crease-resistance variations, etc, but could lead to a complete loss of the integrity of the fabric. In a nonwoven structure, the polymers utilized play an integral role in the use of the fabric and rather than describing the bonding agent as a cement for the fibers, we can also interpret that the fibers are a reinforcement for the chosen polymers.

In order to obtain a suitable balance of the varying properties required, numerous specifications must be placed on the chemicals utilized. The mechanical stability of the emulsion, the elasticity of the polymer, the stability with regard to light and heat, tensile strength, moisture permeability, moisture regain, and numerous other requirements, must be carefully considered. At the present time, the workhorse of this fiber-resin mixture is the synthetic polymer emulsion. Of the type most frequently encountered, nitrile rubbers, acrylic esters, polyvinyl chloride, polyvinyl acetate and GRS play the most important role. Within any group of these synthetic polymers wide variations are made available. Frequently, assumptions are made that studies of the film structures themselves provide data indicative of the potential uses of these polymers in nonwoven fabrics. While this data may be helpful, it is at best only an indication of the relative differences existing between polymers in any one family.

After the formation of the web, it is usually impregnated with varying concentrations of the required synthetic polymers. Depending on the end use, these emulsions are either

*Presented before the Northern New England Section on October 17, 1958 at the Quartermaster Research and Development Command, Natick, Mass.

applied alone or compounded with numerous other agents which improve the inherent behavior of either the polymer or the fiber. The distribution of emulsion polymers in a nonwoven web is dependent upon particle size, drying temperatures, density and thickness of the web, viscosity, and the concentration of the bath itself.

The problems of migration encountered in this industry are similar in effect to the control and uniformity of pigments and dyestuffs in the dyeing of synthetic and cellulosic fibers. In processing with pigments, excessive migration is evident on woven fabrics by the obvious increase in the depth of shade and in subsequent poor scrubfastness of the dyed fabric. This transfer of the particle from the interstices of the yarns to the surface of the woven fabric is due to a capillary effect as the water escapes from the interstices of the yarn and is released from the surface.

In the case of nonwoven fabrics, the migration of the polymer results in a hungry area within the structure and subsequent delamination. The polymers used are particles not too different in size from the pigments used in dyeing processes. By saturation, these polymers are deposited randomly on the fibers. In general, the particle size will vary from 0.05 micron to 2.0 microns. The deposition of these particles is not selective, and when a combination of fibers is encountered, varied results can be obtained with regard to adhesion and flexibility at the fiber-resin interface. The more uniform the distribution of resin particles throughout the structure, obviously the greater the resultant strength and life of the fabric.

In essence, with an emulsion polymer, an ideal situation would involve imparting adequate mechanical stability in order to process the emulsion in many diversified ways and to impart poor thermal stability so that coagulation of the polymer will occur in a more rapid manner during the early stages of drying. Migration of this type is controlled by adding heat-sensitizing agents, controlling the drying conditions, and imparting the highest maximum solids from the bath with the lowest possible concentration of water. Different techniques will be necessitated depending on the individual emulsion utilized, as well as the fiber selection. However, one generality similar to conventional dyeing techniques is that lower temperatures in the range of 220° F to 250° F should be maintained until at least one-third of the moisture is driven off. Higher temperatures may then be utilized, without further threat of migration, to mechanically flow the polymer and to expedite internal as well as external crosslinking.

In many cases, combinations of thermoplastic emulsions and thermosetting resins are desirable in order to obtain the desired end-use properties. Such a combination is essential for a number of specific reasons. As described, the emulsion polymer is essentially limited to the surface of the fiber, either cellulosic or synthetic. This polymer acts as an adhesive and cements the fibers at the numerous crossover points. Many of the existing polymers, however, do not exhibit sufficient resistance to solvent and/or water exposure to effectively maintain their adhesion and initial strength properties. To supplement this required property, thermosetting resins are effectively utilized to reduce swelling of the polymer in the wet state by crosslinking with the reactive sites of the polymer. Although the thermosetting resin is present to act specifically upon this thermoplastic polymer, the monomeric thermosetting resins gain access to the cellulosic fibers as well, thereby minimizing swellability and improving the dimensional stabilization. The latter effect is similarly important for some fabrics in order to impart additional crease resistance, resilience and hand variations.

The term *durability* deserves further consideration with the introduction of nonwoven fabrics. Polyethylacrylate, for example, would be described as a nondurable bonding agent for a nonwoven fabric. In contrast, however, emulsions of polyethylacrylate do provide adequate durability for various finishing effects on woven fabrics. As previously pointed out, a treatment of this type is not improving a tangible requirement of the fabric, but is specifically responsible for its existence.

In general, we might assume that thermoplastic polymers utilized for nonwoven fabrics will conceivably have greater merit on woven goods than the conventional finishing agent for flat goods will have on a nonwoven substrate. There are, however, many instances where a great deal of overlapping does exist at the present time, and in these cases the greatest differential is in application technique.

EMULSION POLYMERIZATION ———To give an illustration of the origin and purpose of a specific type of synthetic polymer, we would like to point to the acrylic esters and derivatives thereof. The basic building blocks in this line of polymers are acrylic and methacrylic acid, methyl, ethyl and butyl acrylate, and methyl and ethyl methacrylate. Although a discussion of emulsion polymerization is beyond the scope of this paper, a few generalities illustrate the problems and considerations essential for the production of chemicals required in this field. These polymers, like numerous types of synthetic rubber polymers, are produced by emulsion polymerization. As the individual monomers are charged into the aqueous phase, polymerization is initiated by the catalysts in the micelles formed by the emulsifying agent. The subsequent polymer outgrows the micelle structure and the emulsifier is subsequently deposited on the dispersed particles.

In the production of emulsion polymers, a number of variables must be seriously taken into consideration in order to obtain reproducibility. Emulsifiers (type and content), pH, temperature, agitation, stability, monomer ratio, etc, all have an important bearing on uniformity, particle size and molecular weight. The importance of particle size and distribution of the polymer in nonwovens has been pointed out; the molecular weight also plays an important role in the solvent and water resistance so frequently required. In the designing of a polymer specifically aimed for use in nonwoven fabrics, the inherent behavior of each monomer and its distribution must be understood. The lower acrylic esters, such as methyl and ethyl, in themselves provide relatively soft films when homopolymers are produced. If higher alkyl substitutes, such as butyl, are used, even greater elasticity, suppleness and softness factors are offered. Table I (*1*) indicates the general performance characteristics of polymers of methylacrylate, ethylacrylate, butylacrylate and methylmethacrylate.

In general, homopolymers alone are not adequately resistant to the numerous wet processes called upon for the resultant fabric and binder to withstand. Copolymerization of monomers is therefore essential to obtain a compromise of the properties desired. A proper balance of monomers must be decided upon in order to impart the desired tear and tensile strength, durability and resilience. When these comonomers are polymerized, the monomers in the linear chain are usually located in a random fashion. Special techniques, however, will permit the grouping of an indi-

TABLE I

Monomer	Tackiness	Hardness vs softness	Tensile strength	Elongation	Water absorption	Brittle point	Water absorption in 24 hours
MMA	tack-free	fairly hard	high	low	slight	high	——
MA	almost tack-free	fairly soft	moderately high	moderately high	fairly high	moderately high	18.8%
EA	tacky	soft and plastic	low	very high	slight	low	13.1%
BA	very tacky	very soft and plastic	very low	extremely high	very low	extremely low	8.4%

TABLE II

Molecular weight	Properties of polymer
2,200	Viscous, colorless oil, soluble in benzene. Low viscosity.
7,800	Tough, somewhat fluid mass. Adheres to glass. Can be drawn out to threads.
14,500	Tougher. Strong adhesion to glass. Swells in benzene, then dissolves.
41,000	Very tough. Nonflowable.
175,000	Tough, elastic, rubber-like mass. Swells, then dissolves in benzene. High viscosity.
1,000,000	Very tough. Insoluble in benzene, but swells to 50 times the original volume.

vidual monomer at predetermined locations of the polymer.

The methylacrylate esters are used effectively to provide the desired degree of stiffness. Where maximum tensile strength is desired, the resultant polymer should be substantially firmer. Conversely, where higher edge tear strength is desired, in synthetic-fiber paper as well as in nonwoven fabrics, a greater degree of elasticity and mobility should be provided; therefore, softer, more elastic and resilient linear polymers should be designed. The monomers listed in Table I may be copolymerized to provide the intermediate effects just described.

Of utmost importance with these copolymers is the fact that plasticization is accomplished internally, thus assuring that the original flexibility will be maintained. The problems encountered with external plasticizers are well known and such conditions can be avoided in producing polymers for the bonded fiber industry. With polymers as mentioned above, the softer monomer may serve as the plasticizer, although it constitutes a major or minor part of the linear polymer itself.

In the past, essentially nondurable bonding agents, by definition, were effectively used for the production of many nonwoven fabrics. Recent developments in certain fields, however, have necessitated the introduction of anchorage points in the polymer so that they may react with themselves, with the fiber, or with external crosslinking agents in order to obtain the necessary durability. It is only in recent years that the art has become aware of the importance of introducing functional groups of certain types into thermoplastic polymers used for the bonding of nonwoven fabrics as well as for conventional textile processing. In general, the original strength, resilience, elasticity and porosity of a fabric can be obtained without detailed chemical modifications. Maintaining these properties through full Sanforized (2) washes, commercial drycleanings, etc, increases the complexity of the problem.

Polymers are manufactured which have taken into consideration a number of the requirements in order to offer versatility in many nonwoven fabric outlets. An optimum ratio of acrylic esters can be chosen with an additional comonomer which enables the polymer to assume the identity of a thermosetting resin under certain select conditions. The monomers chosen to impart this type of functionality allow the polymer to crosslink without the effect of external agents. This is evident by an increase in solvent resistance when comparing films or bonded fabrics dried at 300° F with films or fabrics processed at 240° F. The use of external crosslinking agents will, however, further supplement this resistance, and for optimum durability, melamine resins, ureas and epoxies are frequently utilized.

Acrylic polymers, as well as other types, can be produced in solvent as well as by emulsion polymerization. In the latter case, molecular weights will normally exceed one million. Obviously, therefore, durability factors must be obtained with solution polymers (solvent) by other procedures, since high viscosities will not allow production of these polymers approaching the molecular weights of the emulsion systems.

Table II indicates the effect of molecular weight on the behavior of polyethylacrylate (3) emulsion polymers.

As indicated, greater durability can be offered with an emulsion polymer of this type when a high molecular weight is obtained. This range, however, is a criterion only for the acrylic monomer described, since other monomers may not necessarily behave in a similar manner. When considering solution polymers, it is conceivable that these polymers may serve as more efficient bonding agents than the conventionally used emulsion polymers. By coating the individual fibers with a continuous, uniform layer of resin rather than random distribution of individual particles, it is conceivable that less applied solids will be essential in order to provide comparable strength. A limiting factor with the present solution polymers is the difficulty of incorporating adequate durability in the presence of normally objectionable organic solvents and greater limitations on molecular weight.

Similar mechanisms are employed with numerous commercially available synthetic rubber polymers. The nitrile rubbers, as well as polyvinyl chloride polymers, make valuable contributions to the nonwoven fabric industry. Good drycleanfastness and washfastness is provided with the butadiene-acrylonitrile copolymer latices. These polymers offer unusually good rubber-like characteristics and are widely used where this feature of resilience is important. The nitrile rubbers may also be internally plasticized, thereby insuring stability in end use.

Polyvinyl chloride, long considered chemically unstable, has made great strides in recent years and has made valuable contributions to the nonwoven fabric industry. Where a high degree of tensile strength is essential, these materials make a noteworthy appearance. The unsaturated portion of the polymer has, in many cases, been effectively stabilized and greater resistance to oxidation is offered.

Polyvinyl acetate, although used for specific applications in the nonwoven fabric industry, is limited in numerous phases because of its limited washfastness and drycleanfastness. Its economy, however, is most attractive,

and where original strength is important, as in the case of disposable items, certain industrial fabrics, etc, polyvinyl acetate performs quite satisfactorily.

The volume item of the synthetic rubber family continues to be butadiene-styrene. For bulk industrial fabrics where true rubber-like characteristics are essential, butadiene-styrene is extremely effective. Due to its great susceptibility to oxidation, butadiene-styrene polymers are limited, however, to structures where severe discoloration and subsequent stiffening are not objectionable.

It should be emphasized that the abovementioned polymers, and perhaps others, do fill an important role in the production of nonwoven fabrics. It is obvious to chemical producers and manufacturers alike, that no one classification of chemicals can be universally utilized in this industry with any more success than a single group of dyestuffs adequately performing on cellulosic and synthetic fabrics. Manufacturers of each type of the above synthetic polymers are constantly striving to offer greater versatility and acceptability of polymers that will allow continued and further growth.

THERMOSETTING RESINS——
It has been pointed out that it is quite common to resort to the use of thermosetting resins with thermoplastic polymers. Although this may be a deterrent in many areas, it is unquestionably necessitated with fabrics destined for the apparel trade in order to obtain adequate durability. The principal effect of these resins, as used until recently, has been to combine with the fiber alone. Lately, however, polymers have been produced with certain functional groups so that thermosetting resins may react with both fiber and polymer. With nonwoven fabrics of a high cellulosic content, the thermosetting resin imparts a degree of crease resistance and/or resilience. Even with unreactive bonding agents, they supplement the behavior of the polymer by making the cellulosic fiber less swellable by reacting with the hydroxyl. Crosslinking, by definition, further stiffens the polymer and the subsequent fabric itself. The cyclic ureas, which are reactive only with the fiber or the polymer, are the exception since film forming of the thermosetting resin is avoided.

The choice of thermosetting resin in many ways parallels the logic employed in choosing resins for finishing woven goods. The three principal resins utilized are melamine-formaldehyde, methoxylated urea-formaldehyde, and ethylene urea-formaldehyde derivatives. The melamine resins are extremely effective crosslinking agents for numerous types of responsive synthetic polymers. They have the added advantage of being slightly more effective in improving the wet strength of cellulosic fibers.

The melamine resins are effectively cured at normal temperatures of 300° F to 350° F. As in the shirting and sheeting trade, their main drawback is their susceptibility to chlorine. The melamine-formaldehyde condensates inherently discolor when given a hot chlorination. This phenomenon, incidentally, is more pronounced in a nonwoven fabric than in a shirting fabric, since prebonding and/or nature of the fibers may restrict a greater percentage of the resin to the surface of the fiber.

The principal deterrent is the discoloration noted with the thermosetting resin, since the normally used high concentrations of bonding agent offsets a great extent of the damage created by the liberation of hydrochloric acid and its subsequent effect on the cellulosic fiber.

Dimethylol ethyleneurea resins are similarly effective. As mentioned, the cyclic ureas offer an added advantage of imparting less hand to the bonded web since they are capable of reacting only with the fiber or the reactive sites of the polymer.

The effect of the ethylene urea-formaldehyde resin is, however, more selective with various synthetic polymers and this may be used as evidence that the film-forming characteristics of the thermosetting resin, although in some cases a deterrent, may be more advantageous in the finished fabric.

The cyclic ureas offer the greatest protection to discoloration and chlorine; however, very slight discoloration may still be noted.

The methylated derivatives of urea-formaldehyde act similarly to the melamines. Their resistance to chlorination is comparable to the cyclic ureas, although their film-forming characteristics are similar to the melamines. Both the urea and the melamine resins are catalyzed in a manner quite identical to that followed in the woven goods industry. Ammonium salts, metallic salts, amine hydrochlorides, and so forth, are all used effectively. Drying is normally carried out at temperatures of 220° F to 250° F, followed by curing at 300° F to 350° F.

In view of a chlorine-conscious industry at the present time, further consideration was necessary in order to use crosslinking agents of a nonnitrogenous nature, or sufficiently stabilized to insure protection against chlorine damage and the accompanying optical effects. As the epoxy resins have made their appearance in the woven goods industry, they have similarly appeared effective for producing bonded fabrics. The epoxy resins require more severe catalysis and in general materials such as zinc fluoroborate are most effective. Production in both industries, however, has indicated that this resin and its accompanying catalyst may be run effectively and safely when normal plant precautions are followed. The epoxy resins are, of course, water-insoluble and must be emulsified and then added to the emulsion polymer. The epoxy and catalyst necessary do, however, restrict the selection of some emulsions in view of limited compatibility.

With further reference to a more recently produced resin, the triazones have gained prominence. Although these materials have become commercially available only in recent years, their chemistry dates back some time. In essence, the triazones are stabilized cyclic resins which provide greater buffering effects to the byproducts of chlorination processes. The triazones, however, will discolor when chlorinated and given a hot scorching as proposed by the AATCC. The greatest deterrent to the use of the triazone resins in a nonwoven fabric is the necessity of rather critical afterwashing to minimize fish odor directly attributable to the amines utilized in manufacture. While these resins have made tremendous inroads in the white fabric trade, limitations are placed on their use for nonwovens in view of the restrictions in afterwashing techniques.

In order to obtain drapeability, suppleness and softness with a nonwoven fabric approaching that of a woven fabric, it is obvious that more efficient binders must be developed which will provide similar strength at lower applied solids. The mobility of a fiber is lost in a bonded fabric, and the softness factors are sacrificed.

Fabrics destined for the apparel industry will in general use concentrations of 30 to 50 percent of the total weight of the fabric. It is therefore indicated that greater adhesion is necessary at the fiber-resin interface so that failure is less likely to occur with lower amounts of applied solids. In essence, we are striving for a greater degree of rupture in the fiber itself rather than failure at the fiber-resin interface or the resin itself.

With an increasing use of synthetic fibers, this adhesion could conceivably be enhanced by utilizing a plasticizer

in conjunction with the polymer which will make the fiber surface more receptive to the binder. Such techniques are reportedly effective with the thermoplastic fibers, in that bonding and adhesion can be produced by modifying the surface characteristics of the fiber and imparting greater fiber-to-fiber adhesion.

The chemical suppliers have produced inherently soft polymers exhibiting a great deal of elongation. Although on the surface this appears to be a justifiable stride in producing softer fabrics, the differential is not as great when observed on the fabric. This is true with both externally and internally plasticized polymers. If similar strength properties could be obtained with such a polymer at lower solids concentrations, we could gain this degree of suppleness by the reduction in applied solids alone.

Also to be taken into consideration will be the methods of deposition of the polymer, whether in a single pass, multiple treatment, can dried, hot-air dried, etc. The present producers of nonwoven fabrics have a great deal of versatility in this respect, in that variable properties can be obtained depending upon the conditions under which the resins are applied, dried, cured, and subsequently finished.

SPRAY AND POWDER BONDING ——Although we generally consider by terminology a nonwoven fabric to be a compact fabric-like material, spray-bonded webs or powder-bonded webs also fall into this category. These commodities are generally produced to satisfy a prerequisite of high loft and resilience. Spray-bonded webs are usually passed under high velocity nozzles from which the emulsions are applied under considerable pressure. The webs, varying in thickness from ¼ inch to one inch, are usually carried by a belt or screen directly from the web-forming device, and sprayed one side or both and then dried. Resin penetration is by no means completely uniform, and the inner structure will undoubtedly contain lower amounts of applied solids.

It is important that the emulsions utilized have adequate mechanical stability for the conditions encountered in spraying. The polymers must be relatively tack-free after drying and curing, since residual tack is more pronounced in a spraying operation than by saturation. Webs produced in this manner are usually utilized for quilting, decorative purposes, waddings, paddings, and so forth.

Similarly, webs may be produced with an anhydrous system in which either vinyls, phenolics or acrylics are deposited in powder form throughout the web during its formation. This web is then passed into a heated chamber in which the particles are encouraged to flow and cement the fibers together at numerous crossover points. During this heating cycle, the web may be compressed in order to obtain the desired density. As processing temperatures are raised, specific phenolics exhibit slight thermoplastic properties, thus allowing them to adhere to the fiber before they are polymerized.

Concentrations of phenolics may range form 10 to 25 percent, depending upon the specific end-use requirements. In general the phenolics are available in a substantially smaller particle size than either the vinyls or the acrylics. While in many cases this is an advantage with regards to distribution, manufacturers are usually confronted with a dusty condition in processing.

The acrylics and the vinyls in general are supplied at a particle size of 30 to 75 microns. The processing temperature will vary from 325° F to 380° F in order to obtain adequate flow of the polymer. The acrylics offer an added advantage of not discoloring where higher temperatures are necessary for processing. The specific temperature limitation with this bonding agent is the fiber itself.

Techniques employing dry bonding agents are principally used in order to effectively and economically impart sufficient tensile and tear strength to the structure for its fabrication and end use. The geometry of this structure will not usually allow wet processing in the free state, and it is therefore adaptable to industrial use, or in the case of apparel, in the confines of linings, quiltings, etc.

FIBERS——The cellulosic fibers continue to be the bulk fiber utilized in the nonwoven fabric industry. It should be borne in mind, however, that poundage-wise the disposable variety of nonwoven fabrics utilized for surgical dressings, bandages, etc., amounts to a substantial volume of fiber. The newer synthetic fibers, however, have made valuable contributions to this industry. Nylon and Dacron *(4)* polyester fiber effectively improve the strength of the structure. In addition, they enhance the stabilization and expedite drying in the case of interlinings for wash-wear suitings.

Dacron is frequently utilized in view of its chemical resistance and electrical properties. Orlon *(5)* acrylic fiber and Acrilan *(6)* acrylic fiber, in view of their bulk and softness features, are effectively utilized both alone and in conjuction with cellulosic fibers. The fiber producers in general have spent a great deal of time and effort for research in the development of fibers for this industry, as well as in the expansion of the use of the existing synthetic fibers.

CONCLUSION

At the present time, the greatest technological advances have been made at the manufacturing level. Although it is essential that chemicals be developed specifically for this industry, with their numerous specifications clearly defined, the technique employed in manufacturing is ultimately responsible for the success of the end product. A great deal of technology has been developed by the leaders of this industry, and chemical and fiber producers alike have been alerted by their needs and have taken steps accordingly.

The information given above represents some of the more important considerations for the development of bonding agents used in the nonwoven fabric industry. New technology, as well as expansion of the present know-how is necessary for the continued growth of this commodity. The success of products utilized today can certainly justify the continued efforts of the chemical suppliers involved, in order to keep abreast of the growing needs of this industry, as well as to encourage further and continued consideration of the materials which will and must be developed.

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(6) Trademark registered by Chemstrand Corp.

Tear sheets of articles which have appeared in AMERICAN DYESTUFF REPORTER since July, 1956 are available in limited quantities. (Consult year-end indexes for list of titles). These may be obtained by sending a stamped, self-addressed envelope along with a request for the specific articles. Write TEAR SHEETS, American Dyestuff Reporter, 44 East 23rd St, New York 10, NY.

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TRANSFER TO SENIOR

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Adventure in Research——

(concluded from page 48)

GARMENT MANUFACTURE ——Even the best "wash-and-wear" fabric will not give consumer satisfaction unless construction of the garment and especially the seaming is done properly and with the "wash-and-wear" function in mind. We have seen many "wash-and-wear" garments made from fabric which obviously had excellent properties, but the garment was unsightly after laundering because of puckering of the seams. Manufacturers of quality merchandise are discovering many techniques, which will provide garment construction that matches high-quality finished goods. Important factors in garment construction will undoubtedly include the following: the type of seams to be used, the choice of the needles used for sewing, the proper control of sewing tension, and the type and size of thread to be used. We cannot overlook the styling of the garment because this will play an important role in the ultimate performance of the "wash-and-wear" garment.

CONCLUSION

As these adventures of exploration, exploitation, and growth are repeated again and again, in my company and in other companies, our industry will flourish, and all will benefit.

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AATCC Calendar

COUNCIL, COUNCIL COMMITTEES, RESEARCH COMMITTEES

April 1-3 (Hotel McAlpin, New York, NY)
April 1—Research Committees
April 2—Council Committees, TCR, ECR
April 3 (AM)—Council Meeting
May 29, 1959 (Mount Royal Hotel, Montreal, Canada) AM-Council meeting; PM-Joint luncheon and technical session with CATCC

NATIONAL CONVENTIONS

Oct 8-10, 1959 (Sheraton Park and Shoreham Hotels, Washington, DC); Oct 6-8, 1960 (Sheraton Hotel, Philadelphia, Pa.); September 28-30, 1961 (Buffalo, NY); 1962 (Southern Region)

DELAWARE VALLEY SECTION

Mar 13 (Kugler's Restaurant, Philadelphia, Pa); Apr 11 (Ladies Night—Kugler's); May 22 (Annual Outing—Philmont Country Club, Huntingdon Valley, Pa)

HUDSON-MOHAWK SECTION

April 3 (Chelsea House, Tribes Hill, NY); May 22 (Ladies night, Schuyler Meadow Country Club, Albany, NY); June 26 (Annual outing—Antlers Country Club, Amsterdam, NY)

MID-WEST SECTION

April 25 (Schroeder Hotel, Milwaukee, Wis); June 12-13 (Outing—Brown Lake Resort, Burlington, Wis); Oct 24 (Bismarck Hotel, Chicago, Ill)

NIAGARA FRONTIER SECTION

April 4 (Hamilton, Ont—joint meeting with CATCC)

NORTHERN NEW ENGLAND

Mar 20 (Hotel 128, Dedham, Mass)

PIEDMONT SECTION

April 10-11 (Robert E Lee Hotel, Winston-Salem, NC); June 5-7 (Outing—Grove Park Inn, Asheville, NC); Sept 25-26 (Barringer Hotel, Charlotte, NC)

RHODE ISLAND SECTION

Mar 20 (Providence Eng Soc, Providence, RI); Apr 24 (Student Night); June 12 (26th Annual Outing, Metacomet CC); Sept 18 (Management Night); Oct 23 (Prov Eng Soc, Providence, RI); Dec 4 (Annual Meeting—Johnson's Hummocks Grille, Providence, RI)

SOUTH CENTRAL SECTION

Mar 21, Sept 19 (Hotel Patten, Chattanooga, Tenn); June 26-27 (Outing—Riverside Hotel, Gatlinburg, Tenn)

SOUTHEASTERN SECTION

April 18 (National Guard Armory, Cedartown, Ga); June 12-14 (Summer Outing—Radium Springs, Ga); Sept 12 (Ida Cason Callaway Gardens, Pine Mtn, Ga); Dec 5 (Atlanta, Ga)

WESTERN NEW ENGLAND SECTION

Apr 17 (Rapp's Restaurant, Shelton, Conn); May 15 (Ladies' Night—Rapp's Paradise Inn, Ansonia, Conn); June 12 (Outing—Wallingford, Conn); Sept 25 (Blake's Restaurant, Springfield, Mass); Oct 23 (Annual Meeting—Rapp's Restaurant, Shelton, Conn); Dec 4 (Hartford, Conn)

Activities of the Local Sections

Piedmont

DURING the month of January, the Piedmont Section presented to various libraries in the area sets of the new *Colour Index* for general academic, industrial, and individual use.

H Y Jennings, Dan River Mills, made a presentation on January 6 to Mrs Hugh Robertson, librarian, Danville (Va) Public Library, at a ceremony attended by Julian Stinson, mayor; John Simpson, president of Stratford College; R L Wayland and Charles Zimmerman of Dan River Mills; Curtis Bishop, president, Averett College; and Joseph Taylor, director, VPI Extension.

On January 17, W E Rixon, Union Carbide Chemicals Co, and A Henry Gaede, Laurel Soap Mfg Co, presented a set to Hoyt R Galvin, director of libraries, Mecklenburg County and Charlotte, NC.

Paul B Stam, J P Stevens & Co, Inc, presented a set to Miss Olivia Burwell, librarian, Greensboro (NC) Public Library, on January 22.

As noted previously, Section Chairman Joseph C King, Metro-Atlantic, Inc, presented a set to Charles E Stowe, librarian, Greenville, SC, at the banquet of the Winter Meeting of the Piedmont Section, held January 24 in Greenville.

All presentations were made in the name of AATCC.

GREENSBORO PRESENTATION—Miss Olivia Burwell, librarian, Greensboro, NC; Paul B Stam, J P Stevens & Co, Inc

DANVILLE PRESENTATION—Background, l to r: John Simpson, president, Stratford College; R L Wayland, Dan River Mills; Charles Zimmerman, Dan River Mills; Curtis Bishop, president, Averett College; Julian Stinson, mayor, Danville, Va; Joseph Taylor, director, VPI Extension. Foreground, l to r: Mrs Hugh Robertson, Danville librarian; H Y Jennings, Dan River Mills

GREENVILLE PRESENTATION—L to r: J C King, Metro-Atlantic, Inc, Piedmont Section chairman; Charles E Stowe, librarian, Greenville, SC; Romayne A Barnes, chairman, board of trustees, Greenville Library

Shown registering for the Piedmont Section's Winter Meeting, held January 23-24 at the Poinsett Hotel, Greenville, SC, are, l to r: Victor S Salvin, Celanese Corp of America; Chairman Joseph C King, Metro-Atlantic, Inc; and Milton W Williams, F H Ross & Co. (See meeting report on page 59 of the February 23 issue)

Mid-West

MID-WEST Section held its Winter Meeting February 14 at the Bismarck Hotel, Chicago, Ill. Chairman Jack G Kelley, E I duPont de Nemours & Co, Inc, called the afternoon session to order with 62 members and guests in attendance.

Vice chairman James L McGowan, Morgan Dyeing & Bleaching Co, introduced the speaker of the afternoon, John W Pearce, director of applied research, S C Johnson & Sons Co, Inc, Racine, Wis, who spoke on the subject "D P A" (Diphenolic Acid).

Various suppliers again sponsored a well-attended cocktail party prior to the evening session.

Speaker of the evening was 1958 Olney Medalist Henry E Millson, manager, Dyes Technical Service Laboratory, Organic Chemicals Div, American Cyanamid Co, Bound Brook, NJ, who addressed 71 members and guests. His subject was "The Anomalous Behavior of Direct Dyes."

Chairman Kelley announced the appointment of the following committees to function for 1959: *Technical*—E M Eddington, chairman; *Nominating*—Frank Stover, chairman; *Corporate Membership*—J L McGowan, chairman; *Program*—Arthur J Andrews, chairman; *Scholarship*—Joseph H Jones, chairman; *Publicity*—Bernard Isenogle, chairman; *Outing*—chairman to be appointed; *Auditing*—Erwin J Sindt, chairman.

The next meeting of the Section will be held April 25 at the Schroeder Hotel, Milwaukee, Wis.

DELAWARE VALLEY SECTION OFFICERS FOR 1959—Seated, l to r: Arthur W Etchells, Sectional Committeeman; Clarence A Seibert, vice chairman; William S Sollenberger, Councilor; L Kevin McChesney, chairman; Edward G Haack, treasurer. Standing, l to r: Samuel H Loper Jr, Sectional Committeeman; Thomas H Hart, Councilor; William H Bertolet III, Councilor; Charles H Kuzma Jr, Sectional Comitteeman

Delaware Valley

DELAWARE Valley Section held its first meeting of the year on January 23 at the Adelphia Hotel, Philadelphia, Pa, with Chairman L Kevin McChesney, Leatex Chemical Co, presiding.

Speaker of the evening was Walter H Ridley, manager, Textile Industries Div, The Foxboro Co, whose subject was "Instrumentation — An Integral Part of Dyeing and Finishing." The various methods of recording data and the instruments used were discussed and slides were shown on the installation of this equipment.

W S Sollenberger, American Viscose Corp, outgoing chairman, was congratulated for his work during 1958 by Mr McChesney, who, on behalf of the Section, presented him with a gift.

L to r: L K McChesney, Leatex Chemical Co, Delaware Valley Section chairman; Walter H Ridley, The Foxboro Co, guest speaker at January 23 meeting; F W Allendorf, Geigy Dyestuffs, program chairman

W S Sollenberger, outgoing chairman, (left) receives gift from L K McChesney, Delaware Valley Section chairman during January 23 meeting of the Section

The next meeting of the Section will be held this Friday, March 13, at Kugler's Restaurant, Philadelphia, Pa, at which time Henry E Millson, American Cyanamid Co, will discuss the use of sequestering agents in the dyeing of wool, cotton, and other fibers.

The annual Ladies Night Meeting will be held at Kugler's April 11.

HEAD TABLE—WINTER MEETING, MID-WEST SECTION—Seated; l to r: Jack G Kelley, E I duPont de Nemours & Co, Inc, chairman; Henry E Millson, American Cyanamid Co, afternoon speaker; Joseph H Jones, Phoenix Dye Works, Councilor; John W Pearce, S C Johnson & Sons, Co, Inc, evening speaker. Standing, l to r: Frank H Gurry, Aurora Bleachery, Inc, treasurer; Walter H Sites, Ciba Co, Inc, secretary; James L McGowan, Morgan Dyeing & Bleaching Co, vice chairman

Local Section Activities——

Schlaeppi

Croxson

Northern New England

NORTHERN New England Section will hold its next meeting March 20 at Hotel 128, Dedham, Mass, starting at 6 pm. Two speakers, prominent in their field, will discuss their particular specialty in dyestuffs.

Fernand Schlaeppi, technical mgr, Ciba Co, Inc, will present a paper entitled "The Application of Fiber-Reactive Dyes on Wool." This will deal with the mode of dyeing and the practical use of the Cibacron (reactive) dyes on wool.

Thomas E Croxson, group leader, dye application service, The Chemstrand Corp, will discuss "Union Dyeing of Acrilan/Wool Blends." He will cover the Chem-acril dye method for producing Acrilan/wool union shades in a one-bath procedure employing the same dyes for both fiber components.

Hudson-Mohawk

CHARLES R Williams, Research Dept, Monsanto Chemical Co, Springfield, Mass, will discuss "Mechanisms Influencing Wash and Wear of Cellulosic Fibers" at the next meeting of the Hudson-Mohawk Section. The meeting, which has been moved up to April 3, will be held at the Chelsea House, Tribes Hill, NY.

Rhode Island

APPROXIMATELY 160 members attended the January 30th meeting of the Rhode Island Section, held at Johnson's Hummocks Grille; Providence, RI.

Speaker of the evening was E P Sommer, vice president, Carbic Color and Chemical Co, who spoke on the subject "Remazol Colors—A Chemically New System of Fiber-Reactive Dyes".

Employment Register

This column is open for two insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the secretary of the Association, Post Office Box 28, Lowell, Mass. It is understood that these will be open to inspection by prospective employers who can obtain further information from the secretary.

59-2

Education: BS, chemistry, Brooklyn College; BS, dyeing and textile chemistry, Bradford Durfee College of Technology.

Experience: Textile chemist; manager, dyeing & finishing plant. (Complete resume on request).

Position desired: Managerial—administrative or technical production and quality control.

Location desired: East coast—anywhere.

Age: 34; married; veteran; references.

59-3

Education: Long Beach High School; BS, N C State College; NYU Graduate School of Business.

Experience: Customer service laboratory; plant—quality control, supervision, laboratory.

Position desired: Dyer or assistant; plant chemist, technical service.

Location: 1st—New York Metropolitan area; 2nd—anywhere.

Age: 28; single; references.

OLNEY MEDAL AWARD CANDIDATES

The Olney Medal Award Committee invites Senior members of AATCC to nominate candidates for the 1959 Olney Medal.

The medal is awarded for outstanding achievement in the field of textile chemistry, including the development of chemical agents or chemical processes used in the manufacture of textiles, or methods of their evaluation. Its purposes are to encourage and afford public recognition to such achievements and contributions and to be a testimonial to Dr Louis Atwell Olney in recognition of his life-time of devotion and multitudinous contributions to this field.

Nominations should set forth in detail all facts which qualify the candidate of consideration, with particular reference to published works and professional qualifications.

Previous winners of the Olney Medal are: Milton Harris, William H Cady, Edward R Schwarz, Harold M Chase, Charles A Seibert, George L Royer, Raymond W Jacoby, Werner von Bergen, Roland E Derby, William D Appel, Miles A Dahlen, Walter J Hamburger, P J Wood, and Henry E Millson.

The voting members of the committee on awards are: Paul J Meunier, Chairman; Edward W Lawrence, Milton Harris, James L Taylor, and President Weldon G Helmus, ex-officio.

Nominating letters and complete data should be in the hands of the committee by April 1, 1959. Please address to G P Paine, secretary, Olney Medal Committee, AATCC National Headquarters, Box 28, Lowell, Mass.

TCR Meeting———

(concluded from page 40)

ous portions of the new form and pointed out that the use of this form was in agreement with the basic method of appointing members to research committees as specified in Section C2.1 of the "Manual of Procedure" recently circulated to research committee personnel. He further stated that copies of the new form together with an explanation as to its use would be circulated to chairman of research committees.

AATCC RESEARCH LABORATORIES———H W Stiegler, AATCC's director of research, reported briefly on recent progress made on the major committee projects assigned to the AATCC research staff.

A proposed draft was developed for a tentative test method for abrasion resistance based on the Accelerotor. This test method is based upon the work reported jointly by the Committee on Resistance to Abrasion and the AATCC Research Laboratories. The pertinent article, "Abrasion Testing of Textiles with the Accelerotor —Reproducibility in Interlaboratory Tests", appeared in the October 6, 1958 issue of the *American Dyestuff Reporter*. The Committee is currently in the process of revising the proposed test method for eventual submission to TCR through letter ballot.

Another major project, sponsored by the Committee on Colorfastness to Washing has resulted in the development of Tentative Test Method 87-1958, Colorfastness of Textiles to Industrial Laundering — Accelerated Test, as published in the October 6, 1958 issue of the *American Dyestuff Reporter* along with an article by the chairman entitled "Colorfastness of Textiles to Industrial Laundering."

Top priority has been recently given to two other projects, in current progress, sponsored by the Committees on Damage Caused by Retained Chlorine and Dimensional Changes in Textile Fabrics.

NEXT MEETING ——After the TCR Meeting, the Council decided to hold its next meeting on April 3, 1959. The chairman of TCR subsequently called the next meeting for April 2 to follow a two-day series of research committee meetings on April 1 and 2. All meetings will be held at the Sheraton-McAlpin Hotel in New York, NY.

Respectfully submitted,
C J MANDIKOS
Recording Secretary
Technical Committee on Research

News of the Trade

Sir Hugh Stott Taylor To Address TRI

Featured speaker at the Monday, March 23, luncheon at the 29th Annual Meeting of Textile Research Institute will be Sir Hugh Stott Taylor, president of the Woodrow Wilson National Fellowship Foundation and dean emeritus of the Graduate School of Princeton University. Dr Taylor is recognized as one of the world's leading physical chemists; he served as chairman of the Princeton University Department of Chemistry for 25 years. He has received many honors in his field of science and has contributed in a major way in furthering the causes of textile research and education. His topic will be "Graduate Education in the National Interest."

(See earlier story on TRI's 29th Annual Meeting on page 100 of the February 9th issue.)

Silicones to be Spotlighted Year-Round by Dow Corning

Coordinated national promotion plans to stress the "built-in" values of Syl-mer grade silicone finishes on apparel and decorative fabrics for all seasons of the year have been announced by Dow Corning Corporation.

The company for the past four years has concentrated most of its promotion emphasis during the so-called "season for silicones," from September to December, to play up the wet weather resistance of the finish. Other positive values of Syl-mer grade finishes important to fabrics the year round will now be strongly accented. These are said to include the spot and stain resistance of the finish, its ability to impart a softer, better hand and wrinkle resistance to natural and synthetic materials, and the easier-care qualities it gives to apparel and home furnishings fabrics.

Formulators now producing Syl-mer grade finishes in Dow Corning's licensing program are The Arkansas Co, American Cyanamid Co, The Cravenette Co, Metro-Atlantic, Inc, Onyx Oil & Chemical Co, Refined Products Co, Soluol Chemical Co, and Warwick Chemical Div of Sun Chemical Corp.

The expansion of Dow Corning's tagging program to provide effective sales help for merchandise finished with Syl-mer brand silicone is a part of the trade promotion plans.

Belle Chemical Move to South Postponed

Belle Chemical Co's contemplated move to the South has been postponed as a result of a fire at the firm's Reading, Pa plant in January.

Damage to the plant and equipment as a result of the fire on January 8 was considerable, but the plant was back in substantially full operation by January 16th. In the meantime, Belle Chemical's recently expanded Womelsdorf, Pa plant had been handling finishing operations in addition to manufacturing crude dyestuffs and intermediates.

When the Company's move to the South takes place, ample warehousing facilities for its northern customers will be maintained.

Commonwealth C&C Changes Name

The name of Commonwealth Color & Chemical Co has been changed to Comcollid Inc. The change became effective January 1, 1959.

Belfast License Granted to Bradford

Bradford Dyeing Association, Westerly, RI, has been granted a license by Deering Milliken Research Corp to process its "nonresin" cotton fabric, trademarked Belfast.

Belfast fabrics are said to be the product of a permanent modification of the cotton fiber which makes them "self-ironing" for the life of the fabric. They are claimed to be washable by hand or by automatic machine including cycle, spin or tumble dry, to be nonchlorine retentive, and to have built-in resistance to degradation caused by chlorine bleaches.

"Belfast self-ironing fabrics fill a great need in the apparel industry for dress goods, blouses, uniforms, shirtings and many other uses," said Ernest J Chornyei, executive vice president of Bradford, "and the Belfast process which Bradford is now licensed to produce is an important addition to the diversified finishes which we are equipped to perform."

Russell Newton, president of Deering Milliken Research Corp, said, on granting the Belfast license to the Bradford Dyeing Association, "We take great pride in being associated with Bradford because of the company's recognized quality and standing in the finishing field."

Tanatex Sets Up Facilities in Holland

The Tanatex Chemical Corp, Kearny, NJ, has opened a plant in The Netherlands to supply textile dyers and finishers in Western Europe with the company's processing chemicals. The new organization, known as Tanatex Chemical (Holland) NV, is a wholly owned subsidiary. Offices and laboratory are located at Der Kinderenlaan 3, Laren N-H, The Netherlands. Jan B Wielinga is general manager of the new enterprise.

Tanatex Chemical (Holland) N V is designed to meet demands of the European market for some of the exclusive Tanatex-developed processing chemicals by manufacturing them in The Netherlands. The Dutch organization will also offer laboratory and customer service.

Among the first products to be manufactured in Holland will be Carolid, a nontoxic carrier for dyeing polyester fibers.

Texall Products to Represent ECCO in Canada

Appointment of Texall Products Co Ltd as Canadian representative of Eastern Color & Chemical Co, Providence, RI, has been announced by Michael Shepard, president.

Texall Products Co Ltd will act as exclusive agent for sale of Eastern Color & Chemical's products in Canada. Texall Products' president, Clarence E Robinson, anticipates that his company will be in a favorable position to expand its services further with the new products made available by Eastern.

Headquarters of Texall Products Co Ltd is in Montreal. In addition to the resources of Texall Products, Mr Robinson states, his company's projected sales and service program will make available to the Canadian textile industry the laboratory and technical facilities of Eastern Color & Chemical Co.

56th Phi Psi Convention

The 56th Annual Convention of Phi Psi Fraternity will be held at the Atlanta Biltmore Hotel, Atlanta, Ga, on April 23, 24, and 25. Hosts for the event, according to George F Long, Grand Council President, will be Theta Chapter (Georgia Tech), and the Atlanta Alumni Chapter of Phi Psi.

Four Textile Firms to Support NCSC Radiological Lab Project

Four major textile firms have agreed to support, along with the Atomic Energy Commission, a $275,000 basic research project to be conducted over a three-year period at the new radiological laboratory of the School of Textiles Research Center at North Carolina State College, Raleigh, NC.

The four mills, which will supply 20 percent of the funds required, are Burlington Industries, Inc, Cone Mills Corp, J P Stevens and Co, Inc, and Reeves Brothers, Inc. The remaining 80 percent of the money will be provided by the AEC.

The proposed research program will explore the effects of nuclear energy on fibers, fabrics, and textile processes. Work has already begun.

The radiological laboratory at the College's Textile Research Center was completed last fall at a cost of $96,000, and at that time received a cobalt-60 source to be used in research in an effort to find industrial uses for nuclear radiation. William C Newell serves as director.

The proposed study reportedly will cover four areas of potential applications. They are: modification of fiber properties by irradiation; modification of fiber and fabric properties by finishes applied by using nuclear radiation; use of beta gauges for measurement and control of textile processes; and use of activation-analysis techniques for textile research.

Perkin Centenary Trust

The Perkin Centenary Trust has been established as a lasting memorial of the occasion of the centennial observance of the discovery of Mauveine, the first important synthetic dye, by William Henry Perkin in 1856. The Trust is designed to promote technical education in all aspects of the manufacture and application of coloring matters.

The Trustees invite applications for the following awards for the academic year 1959-60:

The Perkin Centenary Fellowship is offered for one or two years to a graduate for the purpose of higher study of any subject related to the manufacture or the application of coloring matters. It has a value of not less than £600 per annum, and is tenable, from October 1959, at any university, technical college, or other institution, approved by the Trustees. Applications, on forms available from the Secretary, must be received not later than May 1, 1959.

The Perkin Centenary Scholarship: Two such awards are offered, each for two years starting in October 1959 and renewable at the discretion of the Trustees for one further year, to enable candidates employed in an industrial firm or other institution concerned with the manufacture or the application of coloring matters to receive an education at a university or technical college. Each award will have a value of £300 per annum. There is no means test for the award, and a successful candidate is not debarred from receiving the whole or a part of his normal salary from his employers during his tenure of the Scholarship. Applications on forms available from the Secretary. must be received not later than May 1, 1959.

Perkin Centenary Trust Travel Grants. The Trustees will consider awarding grants to assist teachers concerned with the study of any aspect of the manufacture or the application of coloring matters at any appropriate university, technical college, or other institution, to make short visits to comparable institutions in other countries in order to increase their knowledge of the subject. Applications must be received by the Secretary not later than May 1, 1959. These should contain as much detail as possible about the objects and duration of the intended visit and the amount of the grant required. They should also be accompanied by the recommendation of the Professor or the head of the department in which the applicant is working. These grants will, for the year 1959/60, take the place of the Perkin Exchange Lectureships advertised in the two previous years.

Inquiries relating to the above awards should be addressed to: The Secretary, The Perkin Centenary Trust, c/o The Chemical Society, Burlington House, London, W1, England.

Avisco Aid-to-Education Program

Seventy-one colleges and universities will benefit from the American Viscose Corporation aid-to-education program next year.

American Viscose Corporation's program is designed to aid these educational institutions in their overall programs and encourage the study of science and engineering. The recipients of the scholarships and fellowships are selected by the schools on the basis of scholastic merit and need. American Viscose takes no part in this selection, nor are the students under any obligation to the Corporation.

Scholarships valued at $500 each have been awarded for undergraduates who are majoring in textiles, chemistry, physics, engineering, and business administration. Fellowships for graduate work, ranging from $2,000 to $2,800, have been established in the fields of chemistry, chemical engineering and cellulose chemistry. Grants-in-aid have been awarded for various branches of study to three foundations.

"Man-Made Textile Encyclopedia" to be Published in September

Textile Book Publishers has announced the forthcoming publication of the "Man-Made Textile Encyclopedia," a 1200-page, illustrated volume.

Jack J Press, chief of the Textile Branch, U S Navy Clothing and Textile Research Laboratory, is editor-in-chief of the Encyclopedia, and is assisted by an editorial advisory board headed by Herman Mark, of the Institute of Polymer Research at Polytechnic Institute of Brooklyn. The "Man-Made Textile Encyclopedia" reportedly will serve every interest in the textile industry from chemical raw materials to the manufacture and processing of fibers and yarns; from weaving and knitting to the design, manufacture, renovation, and marketing of apparel and other end-use products—consumer, military, and industrial. It will contain twenty-two chapters with over 150 articles contributed by experts in each area treated and will be a large 8½" x 11" format.

The publication date of the Encyclopedia, and the deadline on the special $15.00 prepublication price, have been extended to September 1st. Because of the reception of the book in the industry and the trade, the publishers announced recently that the first printing—originally scheduled for 7,000 copies—will be increased to 10,000 copies.

$20,000 Bequest to Aid LTI Chemistry Students

A bequest of $20,000 from the estate of the late Russell Weeks Hook of Rye, NH, has been made to the board of trustees of Lowell Technological Institute to be used to assist needy students in LTI's division of chemistry.

Mr Hook, who died in 1956, was graduated from LTI in 1905 and taught at his alma mater before joining the staff of Arthur D Little, Inc where he was a textile chemist for many years.

MCA Conference on Pollution Abatement

Two years of progress in water- and air-pollution abatement by the chemical industry will be demonstrated on the program of a two-day conference sponsored by the Manufacturing Chemists' Association March 18 to 19 at the Netherlands Hilton Hotel, Cincinnati, Ohio.

The conference, similar to one held two years ago, has been arranged primarily for chemical manufacturing companies, pollution research specialists and representatives of Federal and state agencies, although registration is open to all interested persons. The MCA's air and water pollution abatement committees first began sponsoring such conferences seventeen years ago.

The capacity of streams to assimilate organic chemicals and factors determining the need for effluent treatment will be discussed by Prof D J O'Connor, Manhattan College, opening the first of the panel sessions. Vernon Stack Jr, Union Carbide Chemicals Co; J C Lamb of American Cyanamid Co; W M Steinfeldt of Eastman Kodak Co; and J T Garrett, Monsanto Chemical Co will discuss the choice of equipment for biological oxidation, and describe activated sludge aeration and the use of stabilization basins.

The March 19 program will include consideration of specific water-pollution abatement problems including the incineration of solid wastes to be discussed by Charles Sercu and T J Powers, Dow Chemical Co. A report on the restoration of natural flora and fauna in recovered streams will be given by Ruth Patrick, director of the MCA-sponsored stream research project at the Academy of Natural Sciences of Philadelphia.

FRL Scientist Discusses W&W on Boston TV Show

Televiewers in central New England Feb 16 witnessed a presentation on "wash and wear," its deficiencies and efficiencies, when scientists of Fabric Research Laboratories, Inc, put on a half-hour educational television program.

The "Dateline Boston" show, carried by Boston's WHDH-TV in cooperation with the American Chemical Society, reached an audience estimated at 100,000 and gave viewers an opportunity to hear a report on the controversial merits of "wash and wear."

Generally, the remarks of Francis K Burr, senior associate at FRL, praised the textile development. Burr admitted that confusion over what was actually meant by the terms wash and wear, drip dry, line dry, easy care, etc, had caused much consumer disillusionment and added that there were undoubtedly poor examples of wash-and-wear-labeled fabrics on the market. At the same time, he said there were many excellent ones now available and that the textile industry was making a concerted effort to bring real meaning to wash-and-wear and related labels.

Burr put two dolls wearing pleated cotton dresses in a large soapy bath and "washed" them. When the dolls were removed, a camera closeup revealed that one dress, which had been resin-treated, retained its pleats perfectly even though soaking wet while the other dress was completely wrinkled. This was used as an illustration that the discriminating buyer can now purchase wash and wear fabrics which will perform precisely as claimed on their labels.

Other speakers on the show were Walter J Hamburger, Ernest R Kaswell, and Kenneth R Fox, FRL founders; Henry M Morgan, assistant director; and E James Stavrakas, another FRL senior associate.

"Dateline Boston" is a nightly educational television program presented by WHDH-TV. The American Chemical Society is responsible for the show's presentation on the third Monday of each month.

Dow Establishes Charlotte Textile Sales Group

A new textile fibers sales center, which will serve nine southern seaboard states from North Carolina to Texas, has been established in Charlotte, NC, by The Dow Chemical Co.

Amos L Ruddock, sales manager of Dow's Textile Fibers Department, said the Charlotte operation will be the largest outside New York for his department.

Dow has three textile fibers—Zefran, an acrylic alloy introduced commercially last fall; Rovana, a new vinylidene chloride copolymer fiber formerly known as Q-957; and the Lurex line of metallic yarns.

Fibers sales will be housed in a new Dow sales office, which opened February 2 in the Wachovia Bank Building. The office, managed by Ted Caldwell Jr, will also serve area markets in the other major Dow product lines.

The office, Dow's 19th, also will house flexible packaging sales activities of the Dow Dobeckmun Company division.

District sales manager for textile fibers sales will be William B. Guerrant.

Dow has announced also the relocation of its Boston sales office to 520 Boylston St, Boston 16, Mass.

General Calendar

AMERICAN ASSOCIATION FOR TEXTILE TECHNOLOGY
Apr 1 (Della Robbia Room, Hotel Vanderbilt, New York, NY)

AMERICAN COTTON MANUFACTURERS INSTITUTE
Mar 19-21 (Annual Convention — Palm Beach Biltmore Hotel, Palm Beach, Fla)
April 15-16 (ACMI Cotton Fiber Testing Lab Open House, The Clemson House, Clemson, SC

AMERICAN OIL CHEMISTS SOCIETY
April 20-22, 1959 (Roosevelt Hotel, New Orleans, La; Sept 28-30, 1959 (Statler Hotel, Los Angeles, Calif)

AMERICAN TEXTILE MACHINERY ASSOCIATION
May 23-27, 1960 (American Textile Machinery Exhibition, Auditorium, Atlantic City, NJ)

CANADIAN ASSOCIATION OF TEXTILE COLOURISTS AND CHEMISTS (QUEBEC SECTION)
Mar 21, Apr 18 (McGill Univ, Montreal, Que); June 20 (Annual Golf Tournament)

DRUG, CHEMICAL AND ALLIED TRADES SECTION, NY BOARD OF TRADE
Sept 17-20 (69th Annual Meeting, Sagamore Hotel, Bolton Landing, Lake George, NY

THE INSTITUTE OF TEXTILE SCIENCE
Mar 18 (Third Annual Meeting and Seventh Scientific Session—Toronto, Ontario)

INTER-SOCIETY COLOR COUNCIL
April 1 (28th Annual Meeting, Statler Hilton Hotel, New York, NY)

THE FIBER SOCIETY
April 29-30 (Fontana Village, NC)

KNITTING ARTS EXHIBITION
May 4-8 (Atlantic City Auditorium, Atlantic City, NJ)

MANUFACTURING CHEMISTS' ASSOCIATION
Mar 17-18 (Air and Water Pollution Abatement Conference, Netherlands Hilton Hotel, Cincinnati, O)

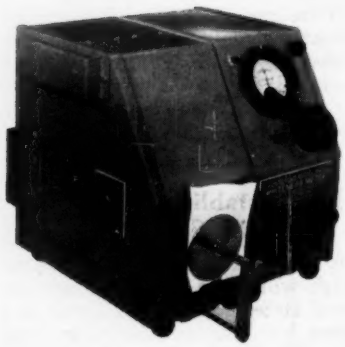
NATIONAL COTTON COUNCIL
Oct 7 (Chemical Finishing Conference, Mayflower Hotel, Washington, DC)

PURDUE INDUSTRIAL WASTE CONFERENCE
May 5-7 (Purdue Memorial Union Bldg, Purdue Univ, Lafayette, Ind)

SYNTHETIC ORGANIC CHEMICAL MANUFACTURERS ASSOCIATION OF THE UNITED STATES
Mar 11, April 14, June 9, Sept 15, Oct 13, Nov 4 (Luncheon meetings at the Hotel Roosevelt, New York, NY); May 11-13 (Spring Outing—The Cavalier, Virginia Beach, Va); Dec 2 (Annual meeting and dinner—Hotel Roosevelt, New York, NY)

TEXTILE SUBCOMMITTEE, AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS
April 2-3 (1959 Conference on "Electrical Applications in the Textile Industry," Heart of Atlanta Motel, Atlanta, Ga)

• NEW PRODUCTS AND DEVELOPMENTS •



HAL Whiteness Reflectometer

Whiteness Reflectometer

Hunter Associates Laboratory, Inc, McLean, Va, has designed a new whiteness reflectometer, which is expected to find application in the textile field for the measurement of progress in bleaching both by chemical and optical bleaches.

HAL believes the instrument to be the only one available which will separate and measure the contribution of whiteness of optical bleaches. It is also suggested that the reflectometer may prove useful in evaluating the color quality of textile fibers, especially cotton and wool. Cost of the instrument is said to be one-sixth that of the Automatic Nickerson-Hunter Cotton Colorimeter.

The HAL whiteness reflectometer reportedly can be equipped with an ultraviolet absorbing filter, which may be alternated between the incident and viewing light beams to measure directly the contribution of the widely used fluorescent brighteners to specimen whiteness. The instrument uses paired vacuum tubes in a null Wheatstone bridge circuit. It employs a 45°0° geometry and has green and blue tristimulus filters each with a separate pair of phototubes.

The instrument is built in two sections identical in size and shape so that, when bolted together, they form a small, compact unit. On the left side are the light source, phototubes and 2¼" round specimen viewing area. On the right side are the measuring circuit, vacuum-tube galvanometer and digital dial. When desired, these two sections can be separated by the cable length between them for convenience of sample presentation. An attachment is available with which to reduce the 2¼" round specimen area to ⅜".

Anionyx RW

A new anionic surface-active agent, which is said to offer exceptional rewetting properties, has been developed by the Onyx Oil and Chemical Co, Jersey City 2, NJ.

Philip E MacLean, sales manager, stated that "the high efficiency of this material makes it one of the most economical agents available for all wetting and re-wetting operations in the textile mill."

"Among the special applications for Anionyx RW," said Mr MacLean, "are proprietary treatment for rapid rewetting in the Sanforized process, adding absorbency in toweling and felt, and as an auxiliary in continuous peroxide ranges."

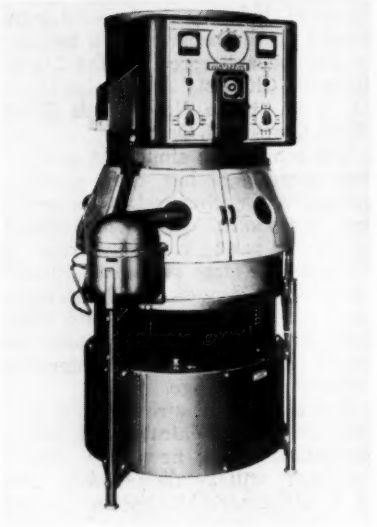
A pale, light syrupy liquid, Anionyx RW is said to be compatible with a variety of nonionic and anionic finishes, such as thermoplastic resin emulsions, alkaline-soluble finishes, thermosetting resins, anionic and nonionic softeners. Generally, Anionyx RW is incompatible with cationic materials, but its compatibility with Xyno Resin X-99, Onyx's cationic resin emulsion, is cited as an exception.

Preliminary technical bulletin and samples are available from Onyx on request.

New Sandoz Dyes

A new disperse yellow, said to be particularly suitable for dyeing polyester fibers, has been released by Sandoz, Inc. Artisil/Foron Yellow 2GL Ultradispersed paf is said to offer the best economy of all disperse yellows on polyesters. It has good all-around fastness, and is particularly recommended by Sandoz for its stability to sublimation. It is said to give very good results, also, on acetate, nylon and the polyacrylics. Customer leaflet T-8287 is available from any Sandoz District Sales Office.

Cuprofix Yellow C-2RLN paf is a new Sandoz after-coppering dye, giving a bright reddish yellow. Its fastness to light is said to be outstanding, either with Cuprofix or with copper sulfate aftertreatment. It is reported that its washfastness is very good, and its fastness to perspiration exceptional. Resin finishing reportedly causes no change in shade or loss of fastness to light. Cuprofix Yellow C-2RLN paf reserves acetate. It may be combined with all other Cuprofix "C" dyes.



Model FDA-RC Fade-Ometer

New Model Fade-Ometer

A new Fade-Ometer, Model FDA-RC, has been introduced by Atlas Electric Devices Co, 4114 N Ravenswood Ave, Chicago 13, Ill. The new model is equipped with an electrically operated atomizer and cycle meter permitting it to be operated either under conditions simulating the cycling effect and high humidity conditions encountered in the daylight exposure method or under conditions which produce good correlation with the sunlight expsure method where the samples are exposed to sunlight between 9 am and 3 pm.

Fade-Ometers now in use reportedly can be economically converted into the Model FDA-RC by the addition of the new features. Full details are available from Atlas Electric Devices Co on request.

RD-2873-P

A new cationic surface-active agent, RD-2873-P, which is said to display excellent corrosion inhibiting, bactericidal and foaming properties, has been developed by the Chemical Division of Armour and Co.

RD-2873-P is described as a 40 percent active isopropanol solution that is soluble in water, benzene, hexylene glycol and carbon tetrachloride. It reportedly has a pour point of less than 0°F.

Further information may be obtained by contacting Armour and Co, Chemical Div, 1355 West 31st Street, Chicago 9, Illinois.

Bancroft Announces "X" Process

The development of a nonresinous process that is said to "transform cellulosic cloth into a new fabric with greatly improved easy-care properties", was announced on February 5 by W R MacIntyre, president of Joseph Bancroft & Sons Co. Extensive trial runs have been completed and full production reportedly can be expected at the Bancroft plant this summer.

The chemical principles involved are said to be entirely new. Patent applications have been made and a trademark will be assigned shortly to this new member of the Everglaze family of fabrics. Until then, the development will be known as Research Project "X".

In his announcement, Mr MacIntyre said that fabrics produced by the new process have a host of distinctive properties, the most important of which are substantially improved compatibility for resin treatment if desired, recovery from wrinkles when wet, a soft, non-irritating hand and life which means new wearing comfort, and permanently improved dimensional stability.

Pointing to the fact that the chemical composition of the basic fiber is permanently altered, Mr MacIntyre said that cloth subjected to the "X" process is unique in that the resultant change is not due to a special finish but rather to a complete transformation in the fabric itself, wherein all of the desirable characteristics of the original cloth are retained, most of the bad ones discarded, and new and improved features acquired.

He hailed the process as another significant advance in Bancroft's continuing research program designed to develop fabrics and garments that are dependably and permanently "wash-and-wear". In this connection, he noted that the "X" process makes possible a wide range of garments which have a greatly improved resistance to creasing when dry and an exceptionally high degree of wet and dry wrinkle recovery. They also are said to have a pleasantly improved hand which is soft and smooth against the skin.

Mr MacIntyre said that, since the new fabric is more compatible to resination than the original cloth, practically no degradation of the fibers or any appreciable loss of wet or dry tensile strength occurs. When resinated, the new "X" fabrics reportedly have a wet resilience and crease recovery as good as the dry. And from the standpoint of comfort, the soft, non-irritating hand remains unchanged for the life of the fabric, it is claimed.

The resulting combination of properties, he said, makes possible the production of garments which need no ironing after washing because, as a result of the chemical change in the basic fibers, they literally iron themselves as they are washed and dried. They are said to stay fresh and resistant to mussing throughout the day, and can be laundered by any normal commercial or home method, without starch and using any type of bleach.

Mr MacIntyre also called attention to the improved dimensional stability, the sharply increased resistance to dirt, stain and rust, and the almost complete lack of linting.

The treatments are also said to increase the life of the fabric and garments made from it.

Fabrics treated by the "X" process can be easily washed at home or by commercial laundry, and reportedly may be drip, tumble or spun dried. Repeated launderings are said to actually improve rather than impair the many wash-and-wear properties. Drying time is reduced by as much as 30% in comparison with cottons finished in the usual manner, it is claimed. It is further claimed that there are no odor or chlorine-retention problems with these fabrics and that they have a lasting resistance to perspiration, mildew and bacterial damage.

The chemicals and procedures involved in the "X" process are said to be applicable to cottons, cotton blends and some synthetics.

Mr MacIntyre said that, from a practical finishing standpoint, the processing involves new, continuous, but comparatively uncomplicated procedures utilizing commonly available equipment.

The properties which result from the "X" process are said to cover a wide field and the true value of some is difficult to assess accurately with presently available test equipment. As a result, the Bancroft Company is developing new equipment and more sensitive methods of evaluation.

Production facilities at the Bancroft plant have been allocated to the new fabrics and a licensing program is under consideration.

Lanolized-WW

Expanding the scope of the Lanolized finish on fabrics for almost all end-uses, Lanolized, Inc, New York, NY, recently announced the successful development of Lanolized-WW directed particularly to wash-and-wear requirements.

Lanolized-WW has been in laboratory research for nearly two years in efforts to add increased washability to this finish. The new product, it is reported, now has excellent durability and effectively fulfills the widespread need for a "natural hand" in almost all resined fabrics.

The finish is said to be applicable to cottons, synthetics and blends.

In addition to improving hand, the finish reportedly increases tear-strength, abrasion resistance and soil-resistance; it will not scorch at elevated temperatures; is nonchlorine-retentive; and sharply reduces needle-cutting. It is claimed that no adverse effect has been discovered in the use of Lanolized-WW associated with dye shades, lightfastness or controlled whites. The emulsions are said to be stable on storage and generally compatible with resins, catalysts and auxiliary agents commonly used in textile finishing.

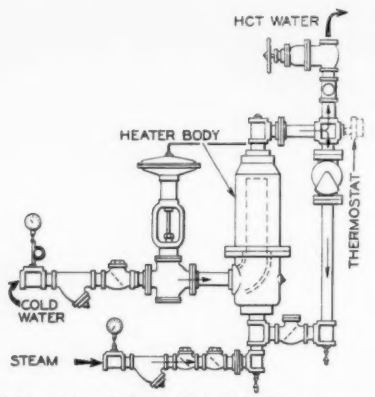
Applied and dried in conventional equipment, fabrics finished and/or afterfinished with Lanolized-WW alone are said to require no curing. When urea-formaldehyde and melamines are used in conjunction with the product, curing time and temperatures would follow the recommended procedures associated with these resins, it is stated.

Lanolized-WW is being licensed by Lanolized, Inc, under its patents, patents-pending and trademarks. All licenses, it was explained, are for quality control purposes and are being offered discriminately in the fields of apparel and domestic fabrics. All inquiries concerning the new finish should be directed to Scholler Brothers, Inc, Philadelphia, 34, Pa.

MCC-100

A new, commercially available latex formulation, MCC-100, developed by the research laboratories of Manufacturers Chemicals Co, 930 North Darien Street, Philadelphia, Pa, is claimed to exhibit highest resistance to gas-fading of any commercially available latex backing material. It is also claimed that it has outstanding resistance to light degradation and oxidation and shows negligible discoloration by copper-containing dyes. MCC suggests that the product's excellent film-forming characteristics allow its use on loosely woven fabrics as well as on carpets and other textiles.

Four or five ounces per linear yard reportedly produces a tough backing which gives dimensional stability and body to the fabric.



Schematic of Pick Mfg Co's low-pressure water heater

Steam-injection Water Heater

"Low-pressure" steam injection water heating is now possible, according to Pick Mfg Co, through the development of a new water heater which the West Bend, Wis, firm has released for distribution.

It is stated that those concerns whose operations and/or locations have their source of steam limited to low-pressure boilers because of various codes, can heat water with the same advantages of temperature control and space-saving that has been possible only by the use of high-pressure steam-injection water heaters.

Actual field application of the new water heater, following its development and pilot operation, reportedly has proved its ability and efficiency to make hot water for installations having boilers with pressure from fifteen pounds psi downward to five psi.

Other basic characteristics of the heater, which the manufacturer feels will expand application of the advantage of steam injection for water heating, include: space saving, because no floor-space is needed (units are hung on walls or fixed to posts); neither tanks nor tubes are required, because water volume flows instantly at preset temperatures; and because the heaters are ideal for installation with portable boiler units.

The steam injection method incorporated in the new heater is Pick's patented design, according to the announcement.

In operation, the heater reportedly provides hot water flow on a push-button basis, with absolute minimum temperature fluctuation for both continuous and start-and-stop requirements. Water-temperature changes are made in less than twenty seconds by simple resetting, it is claimed.

Hot-water volume from the new heater is said to be adjustable from 5% up to full rated capacity. It is manufactured in eight different standard sizes, each of the same design. Capacities range from 500 gallons per hour by the smallest, to the 30,000 gallons of heated water per hour by the largest size. Greater volume is produced by joining multiples of heaters, reportedly with no change in operational characteristics of constant, accurate temperature control.

Possibility of pressure-equalization between steam and water is eliminated, it is stated, thus preventing violent vibrations and the accompanying "steam/water hammer". This is possible because the new heater operates on the same basic principle of their steam injection high-pressure heater, the Pick people state.

It is claimed that heating water by steam injection, with a system of accurate temperature and volume control has been recognized as the safest, most efficient and economical method of developing hot water supply for industrial use. Heretofore, high-pressure steam has been necessary to meet large-volume requirements.

Further details will be furnished on request to the Pick Manufacturing Company, West Bend 3, Wis.

Automatic Rinse Additional Feature of CycleLog Controllers

Automatic rinse control, newly developed for CycleLog Controllers to provide single-instrument control of major dye kettle operations, has been announced by The Foxboro Co, Foxboro, Mass.

With the addition of this feature, the rinse valve reportedly opens automatically to flush away spent dyestuffs and chemicals and maintain rinsing until the end of the cycle. Such control is said to eliminate time-consuming supervision and costly waste of rinse water. Optional on new CycleLog Controllers, rinse control may also be added to instruments now in service.

Easily adjusted settings on the front of the instrument are now said to permit the operator to preset an entire dyeing and rinsing schedule on a single CycleLog Controller: the starting temperature, the desired rate of temperature rise, the dyeing temperature, the holding time, the rate of cooling, and the rinse. The CycleLog controls the dyeing program by pneumatically operating steam, water and rinse control valves at variable time and temperature values.

Varicolored signal lights indicate each stage of the dyeing operation, and a 12-inch circular chart provides a permanent record of the cycle for quality control and future duplication of the dyeing schedule.

Foxboro Model 40 CycleLog Controller

Automatic rinse control is available in two CycleLog models; Model 40 C-HR CycleLog Controller for heating-holding-rinsing, and the Model 40 C-HCR for heating-holding-cooling-rinsing.

Lustra Northlite

A new fluorescent lamp with the lighting characteristic closely resembling that of light from a moderately overcast north sky has been introduced by Lustra Corp of America under the trade name, Northlite. Deliveries have begun from the company's New York, Illinois, and California depots.

Lustra Northlite Fluorescent Tubes are said to be available in all sizes for standard fixtures. Each tube is recommended by the manufacturer for use in direct illumination fixtures as well as in all neutral-diffusion luminaires.

Key to the so-called "color-correct" fluorescent design is said to be a careful and critical combination of fluorescent phosphorus peaked at 480 millimicrons and 580 millimicrons within the structure of the lamp. As part of the normal range of existing electrical facilities of present-day department stores and plant lighting systems, the Northlite will yield a light approximating the 5500° Kelvin temperature of the light chosen by artists and designers for color-correct seeing, it is claimed.

Lustra Northlite, which is said to be designed to avoid the blue emphasis of "daylight" and the red emphasis of "standard cool white," reportedly provides the desirable comfort in seeing of the overhead fluorescent lamp with the color rendition accuracy required for all but the most critical laboratory color-sensitivity requirements.

For further information, write to Lustra, 32-33 47th Avenue, Long Island City, NY.

"X-O" Process

A new chemical process that is said to eliminate odors from resin-treated cottons and synthetics, which are the basis of "wash-and-wear," has been announced by West Point Mfg Co.

It has been successfully tested on more than 50,000 yards of fabrics in actual plant runs in several of the country's leading finishing plants, according to M Earl Heard, vice-president in charge of research.

In every case, he said, it "completely and permanently" rid the fabrics of all formaldehyde and amine odors.

The process, called "X-O", can be applied to all types of resin presently used in wash-and-wear finishing, including ureas, ethylene ureas, triazones, triazines, acetals and their mixtures, Dr Heard said.

"All of these, in today's finishing processes, emit odors resulting from free formaldehydes or amines remaining in the goods after resin treating," he pointed out. "Storage in the presence of heat and humidity intensifies these odors."

The odor-formation problem affects, to varying degrees, finishers, cutters, retailers and consumers, but is most noticeable after storage of goods either at the finishing plant, cutting plant or the retail store, Dr Heard said.

The West Point process has been patented and will be licensed to finishing plants on a royalty basis. Dr Heard said he expects to announce shortly the names of initial licensees.

The fabrics treated by the process, he said, undergo no change in physical characteristics.

"No additional plant equipment or change in present equipment is needed," he added. "The process can be conducted in available equipment at normal speeds and plant personnel can be trained to use it in two or three days."

To determine the extent of the odor-formation problem in the industry, West Point had a management consultant firm do field interviews during the past year.

"These interviews indicate the odor problem varies at each industry level," Dr Heard said. "Cutters and retailers are more concerned about the formaldehyde odor than the amine because of its concentration in large quantities of fabrics handled in confined areas.

"Both types of odors are of serious concern to finishers, who face the problem of possible odor formation after goods leave the plant," he added. "This can be costly, since finishers accept the responsibility for returned goods that contain offensive odor."

With cutters and retailers, Dr Heard pointed out, odor formation affects working conditions. Many have incurred considerable expense to "mask" formaldehyde odors in their plants and stores, he said. Also, he noted, there are cleaning establishments which specialize in removing odors from retailers' stocks of resin-finished goods.

"Consumers are aware of amine odors to a limited degree, especially in warm and humid air, the interviews show," he said. "But apparently most consumers are reluctant to complain of this problem because of its personal nature and their failure to identify its source."

In testing the new process in finishing plants, Dr Heard said, fabrics with unusually heavy resin content were selected since they presented the most difficult odor problems.

Before conducting plant runs, laboratory tests were made in which patches of each fabric were subjected to different concentrations of the "X-O" solution. By using a steam tube odor tester, a West Point development which accelerates the detecting of odors, the correct concentration for actual use in the plant reportedly was determined.

The new process can be applied to conventional plant processing for finishing resin-treated fabrics, ie, scouring or "soaping-off" in a washing train, can drying, followed by top softening and drying, with "negligible changes," according to Dr Heard.

The "X-O" chemicals are added in the top softening pad. Where the last box in the washing train can be segregated or if it is used to apply top softening materials, the process may be applied in the last box.

It is claimed that fabrics treated by the process were tested by a consultant dermatologist group and their report shows they are neither direct skin irritants nor sensitizers.

Aceto Offering Additional Dyestuff Intermediates, Aluminum Formate Powder

Aceto Chemical Co, Inc, 40-40 Lawrence St, Flushing 54, NY, is now offering the following dyestuff intermediates: o-chloraniline, p-chloraniline, m-toluidine, and B acid — 4 chloroaniline 3 sulfonic acid (also known as metanilic acid-6 chloro).

Aceto also has available a new, odorless grade of aluminum formate powder, which it suggests for use as a dye mordant and for waterproofing of textiles. Advantages claimed for the powder over solution forms are: a very high active Al_2O_3 content; lower cost per active unit; savings on freight, storage and handling.

Thermorez

Metro-Atlantic, Inc has announced the development of Thermorez, a new resin designed to impart "wash-and-wear" characteristics to rayon and rayon mixed fabrics. This product reportedly produces extremely high wet and dry crease resistance with a full mellow hand, and a minimum effect on tearing strength and abrasion. The manufacturer claims that it can be blended with softeners, water repellents, and other materials for a wide variety of finished effects. One of its outstanding properties is said to be that it prevents progressive shrinkage.

Cross-linked Dicarboxyl Starch

A new starch derivative developed by the U S Dept of Agriculture holds promise for a variety of industrial applications, including the manufacture of textiles.

Recent research on starch at the Department's Northern Utilization Research and Development Div, Peoria, Ill, has produced the versatile new material. One of its potential uses is as a thickening agent in various paste-like products.

Finding means of chemically treating starch to change the way it responds to water and heat is one aim of USDA research on starch utilization at Peoria. Cross-linked dicarboxyl starch is one of the latest developments in this work.

When ordinary corn starch is dissolved in water and boiled, a thick paste results. When it cools, the starch jells and cannot be poured. In some applications it is desirable for starch granules to take up water and swell to a certain extent, but not to jell when cooled. In producing the new nonjelling starch, it is reported, the first step is cross-linking, which retards water uptake and swelling. Enough cross-links can be added, if desired, to prevent starch from swelling even at temperatures above the boiling point of water.

Additional chemical treatments of cross-linked starch are necessary to obtain dicarboxyl starch. One of them reportedly results in making the starch acidic, which increases its ability to absorb water and to swell when heated, but at the same time the cross-links hold the starch molecules together and help them resist jelling. Heating this modified starch in water with other materials is said to produce a variety of paste-like products that have extremely high viscosities but do not jell when cooled.

FDT Model K Appearance-Retention Tester

Improved Model K Appearance-Retention Tester

Fabric Development Tests has completed development of an improved Model K pilling tester that is said to give larger, softer pills on knit goods and soft woolen and synthetic textiles and more closely simulates actual wear results obtained with these materials.

The new Model K Appearance-Retention Tester reportedly operates at contact pressures as low as 5/1000 pounds per square inch and uses a special 3KS wear disc. Test results are obtained in one-half to two minutes with knit goods and two to twenty minutes with soft woven fabrics, it is claimed. Tests run for different intervals are said to permit determination of the speed and magnitude of pill formation as well as an evaluation of the size and hardness of the pills. The extent and character of pilling are determined by a process of rubbing the test sample over a soiling paper, which simulates preferential pill soiling in wear, and then comparing the soiled sample with visual standards. The harder the pill the more readily it soils.

The Model K machine is said to be equally suitable for testing the pilling of clear-finished fabrics and the surface wear and abrasion of all textiles under similar conditions used with the earlier Model PA Appearance-Retention Tester. For those having the earlier Model PA machine, a Model K conversion unit and the special wear disc are available. Installation of the conversion unit is said to be simple and reportedly gives improved results comparable to those obtained with the new machine.

Further information may be obtained from Fabric Development Tests, PO Box 45, Brooklyn 32, NY.

Polyethylene Emulsion PE-50

Polyethylene Emulsion (PE-50), a new finely dispersed product manufactured by Chemical Products Corp, West Paterson, NJ, is offered as a "dynamic" softener, lubricant and antistatic agent for synthetic and natural fibers. Its compatibility and resistance to needle cutting and abrasion are termed excellent by the manufacturer.

It reportedly may be used alone or with other finishing agents and thermosetting resins.

New Cuprophenyl Blacks

Two new copper aftertreated black dyestuffs that are particularly recommended by the manufacturer for producing attractive deep shades on cotton and spun viscose rayon have been brought out by Geigy Dyestuffs, Division of Geigy Chemical Corp.

These new products are called Cuprophenyl Black BWL 200%, which has a bluish cast, and Cuprophenyl Black GWL 200%, which has a "jetter" shade. They augment Geigy's family of after-coppering dyestuffs, a member of which, Cuprophenyl Black RL, reportedly has already acquired excellent acceptance among direct dyes for rayon because of its very good fastness properties and its desirable acetate reserve.

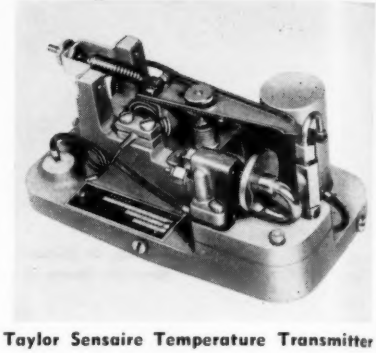
Fastness ratings of the two new materials are generally identical. Typical fastness ratings claimed for these two blacks are: sunlight—6 on cotton, 7 on spun rayon, and on fabrics with crease-resist finish; Fade-Ometer—the same as sunlight; washing at 160°F—4-5; sea water—5; and AATCC rating of 5 on chlorinated pool water, decatizing, wet- and drycleaning, hot wet pressing, acid and alkaline perspiration.

The new Cuprophenyl Blacks are recommended by Geigy for fibers when extremely high fastness to washing and light are required.

Chemware

A complete line of beakers and other laboratoryware made of Teflon has been introduced by Chemplast, Inc, 3 Central Avenue, East Newark, N J, under the trademark Chemware. According to the manufacturer, Chemware is completely noncontaminating and unbreakable, and resists heat up to 600°F.

Chemplast states that exclusive fabricating techniques enable them to make beakers and other items of Teflon with better quality and at lower costs than have heretofore been possible. The new Chemware line includes a full range of beakers, stirring rods, watch glasses, evaporating dishes. Centrifuge tubes are also available.



Taylor Sensaire Temperature Transmitter

Sensaire Temperature Transmitter

The Taylor Instrument Companies' Sensaire Temperature Transmitter is said to be of particular interest to anyone with low-cost temperature-measurement requirements in the minus 30°F to plus 1200°F range.

Versatility and simplicity are said to be offered in a unit having fewer moving parts, assuring longer effective service life. A thumbscrew adjustment zero sets over a wide range. Further range limits and operational spans can be established as needed in the field. The substitution of a different precalibrated and fully compensated thermal system is required. No other changes are necessary, and no barometric effect is noted, it is stated.

The Sensaire Transmitter is described as a sturdy compact unit, unaffected by normal plant vibration. It is said to incorporate the smallest bulb presently available in a filled system with other proven components —the standard Fulscope type relay, and where desired, the standard Speed-Act unit.

A universal-type mounting bracket reportedly permits installation on flat surfaces, pipe lines, well wrench heads, on pipe hangers or on separable bushings; and with various degrees of rotation.

Lamitex CN

Lamitex CN, a new grade of sodium alginate for the textile printing trade, has been introduced by Croda Inc, 51 Madison Ave, New York 10, NY.

The new grade is said to be competitively priced, free from calcium, and used generally in the same way as the old grade Lamitex L.

A technical bulletin on Lamitex L as well as a reprint of an article "Alginates in Textile Printing" by Corda's technical consultant, Gustav Torinus, are available on request.

Cibanone Grey BG Paste; Neonyl Black JT

With the introduction of Cibanone Grey BG Paste, Ciba Co, Inc, is offering a Microfined dye which is claimed to afford the finest level-dyeing properties of all vat greys. The uniform penetration and slow exhaustion of this dye are said to make it of particular interest for dyeing grey shades on beams and packages, but its superior leveling qualities are also apparent in piece goods dyeing, it is claimed.

Cibanone Grey BG Paste reportedly presents an attractive medium grey self-shade, or the color may be shaded to any related cast with most vat dyes of similar application properties. It is especially recommended by Ciba as a component in yarn-dyeing formulas for ginghams, fine poplin shirtings and household furnishing fabrics. Ciba points out that top fastness to light and washing, and the characteristic properties of the Cibanone Microfined process for vat dyes, further identify Cibanone Grey BG Paste.

Additional emphasis on the versatility of Cibanone Grey BG Paste is given by its stability to a number of resin finishes, it is claimed. According to Ciba, aftertreatment of dyeings with Lyofix PR for minimum-care finishes produces practically no change in shade or in the lightfastness of the dyeing.

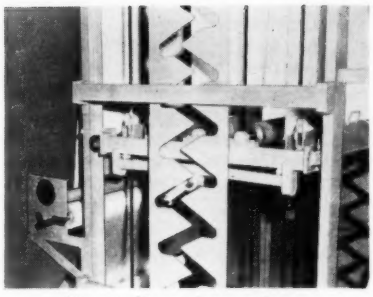
* * *

Neonyl Black JT is Ciba's response to a new demand among customers for a "jetter" shade of a neutral dyeing black for nylon. Immediately available, this new black reportedly has the same dyeing and fastness properties as Neonyl Black CW, while providing the much sought "jetter" values.

Antara Enclosing Spigot in Blancophor Drums

Antara Chemicals, a sales division of General Aniline & Film Corp, is now enclosing a plastic spigot in all 30-gallon closed head drums in which it ships its liquid Blancophor optical brightening agent.

The spigot is contained in the underside of the large two-inch cap of the drum. For use, it is necessary to remove this cap, unscrew the spigot, replace the cap, remove a ¾-inch cap on the drum and screw in spigot. The ¾-inch cap is then replaced and the drum tilted on its side, spigot down and closed. The contents of the drum can then be measured out through the spigot into a suitable container. Directions for use of the spigot are carried on the head of each drum.



Mount Hope Accumulator

Accumulator Features Safety-Lock Carriage

A new accumulator manufactured by the Mount Hope Machinery Co, Taunton, Mass, features protection against personal injury by falling carriage should cloth break. A free-riding pivot arm attached to the under side of the carriage rides in a vertical zig-zag track. Any sudden downward motion of the carriage causes the rider wheel to lock in one of the slots in the track, thus stopping the carriage. The accumulator reportedly stores 40 yards of material for continuous operation. Complete details are available from Mt Hope Machinery Co.

Crestopon

Crest Chemical Corp, 225 Emmet Street, Newark, NJ, has developed Crestopon, a new surfactant chemically described as the sodium salt of a fatty acid-polypeptide condensate. This product is said to combine the protective colloidal and dispersing powers inherent in high molecular weight polypeptides with the unexcelled detergency of soap. The manufacturer claims that this gives a softer fabric and reduced injury to delicate fibers as evidenced by higher tear and tensile strength.

Crestopon is recommended by Crest Chemical for improved kier-boiling, more efficient bleaching and optimum cleaning action on all fabrics at all temperatures. This detergent is said to be stable to strong alkalis, to be free rinsing and exceptionally economical to use.

Crestopon, it is stated, stabilizes chlorine bleaching liquors and protects the fiber from unlevel bleaching and loss of strength. It is explained that this protective action is due to the polypeptide component of the surfactant giving a soluble unstable chloramine as an intermediate, thereby controlling the action.

Crestopon is said to be well suited for vat, acetate and naphthol dyeing because of its high dispersing and leveling properties.

Cloth Web Splicing Process

A cloth web splicing process introduced by Minnesota Mining and Manufacturing Co, St Paul, Minn, is said to reduce downtime and produce a permanent, thin overlap splice even on low-pick goods.

Textile mill usage to date shows virtual elimination of splicing failures and costly "jumping" as splices pass through calender and printing rollers, the 3M company reports.

Permanency of splices results in fewer shut-downs for splicing and less waste of yardage, it was pointed out.

The splice is made by "welding" the cloth ends together with the company's Scotch-weld brand bonding film No. 588 and a "heat jaw" splicing machine especially developed for the purpose.

Tests of the process in bleacheries, finishing plants and dyeing operations reportedly have shown the splices to be resistant to heat and chemicals used in normal textile treating and processing operations.

Splices are made at temperatures of 375° to 400°, under 50 to 60 psi of pressure, for 20 to 30 seconds. The complete splicing cycle, including handling and placement of the cloth roll edges on the machine, takes 40 to 50 seconds on most fabrics.

The bonding film is a dry thermosetting adhesive which, when heat cured in the "heat jaw" machine for 20 to 30 seconds, reportedly provides a bond that is generally stronger than the cloth being bonded — even the most rugged canvas. In making the bond, the film flows into the interstices of the cloth, forming a high-strength splice free of loose warp-ends, it is claimed.

The process is expected to benefit all textile mills, particularly those producing low-pick goods such as tobacco cloth, cheese cloth, gauze or industrial cloth, the 3M company said.

When the film is used on textiles, a half-inch width has been found adequate for an average splice. Cost of the film, which is available from 3M, is approximately 9¢ per hundred inches of splice. The film is also available in smaller or larger widths.

One of the first firms to adopt the new method for full scale use spliced one million lineal yards of tobacco cloth with approximately $2,500 of bonding film, the 3M company said.

Cost of the web splicer, which was developed by 3M's Customer Engineering department in cooperation with the manufacturer, Precision Machine Co of Greenville, SC, runs approximately $4.000.

For further information write Dept T8-341, 900 Bush Ave, St Paul 6, Minn.

• NAMES IN THE NEWS •

Richardson

The board of directors of The Russell Mfg Co recently announced the creation of a new vice presidency and the appointment of **Joe W Richardson** to fill the vacancy. Mr Richardson is now the vice president, Finished Goods Division.

Mr Richardson began his career with Lowell Bleachery South, Griffin, Ga in 1934. He joined Russell Mfg Co in 1938 as superintendent of the bleachery, and served in this capacity until he was named general manager of the Bleachery Division in 1946.

Emery Industries has added **Ulrich W Schneibler, Clarence F Huber,** and **Joseph A Roux** to its research staff.

Dr Schneibler has been with the Diamond Alkali Company in Painesville, Ohio, since 1957. At Emery he will conduct fundamental research involving mechanisms and structures of organic compounds in Emery's Basic Research Section.

Prior to joining Emery, Dr Huber was chief chemist at Carlisle Chemical Works. He will conduct research on the utilization of Emery's products for the Application Research Section.

Mr Roux will work with the Textile Research Group, developing new products and providing field service for Emery's line of textile finishing agents and processing oils. He was previously with the B F Goodrich Chemical Company's Darvan Fiber Project, and has also been associated with the Lowell Technological Institute Research Foundation and the United Elastic Corporation.

Matthew J Schuler, a member of Du Pont's Jackson Laboratory staff at Deepwater Point, NJ, has been promoted to the position of senior research chemist.

Mr Schuler, who joined Du Pont in 1945 as a research chemist at the Jackson Lab, is now a member of the Petroleum Chemicals Div.

Walter J Hamburger, director and treasurer of Fabric Research Laboratories, Inc, Dedham, Mass, and winner of AATCC's Olney Medal in 1956, will be the 1959 recipient of the Harold De Witt Smith Memorial Medal from Committee D-13 of the American Society for Testing Materials.

The Medal, being awarded for the 10th consecutive year, is a testimonial to the memory of the late Harold De Witt Smith, who pioneered in the concept of an engineering approach to the evaluation of the properties of textile fibers and their utilization.

The presentation will be made on March 19 at the spring meeting of Committee D-13 at the Sheraton-McAlpin Hotel, New York, NY.

* * *

Jay C Harris, assistant director of research, Research and Engineering Div, Monsanto Chemical Co, will receive the 1959 Award of ASTM's Committee D-12 on Soaps and Other Detergents at the Committee's annual meeting in New York tomorrow (March 10). The citation recognizes Mr Harris' outstanding efforts in the Committee's work in the development of testing methods and standards, and his many contributions to the science of detergents. Mr Harris served as secretary of Committee D-12 from 1946 until 1950, and since that time has been its chairman.

Shore

Metro-Alantic, Inc, Centredale, R I, has announced the promotion of **James C Shore** to sales manager in charge of all Northern sales, which includes New England, Middle Atlantic States, Mid-West, Pacific Coast, and Canada.

Mr Shore joined Metro-Atlantic, Inc in 1949 as technical director in charge of application development, sales service, and technical sales, and was later promoted to assistant vice president of the Company in charge of sales and technical service in New England and Canada.

Blessing

R Wayne Blessing has been transferred to the Industrial Specialties Sales Department of Procter & Gamble after ten years of experience in the Company's Case Soap Sales Department.

In his new assignment, Mr Blessing will handle the sale of textile soaps, synthetic detergents and specialties to mills in North Carolina and Virginia.

Two veteran employees of Midwest Research Institute, Kansas City, Mo, have been appointed to key posts in the Chemistry and Chemical Engineering Division.

Howard M Gadberry, who has directed and administered programs in product development and special research problems at the Institute since 1954, has been named assistant manager. **Martin N Schuler,** with MRI since 1948, succeeds Mr Gadberry as head, Industrial Chemistry Section.

Atlas Powder Company has announced the transfer of technical representative **Arthur Green** from its chemicals sales office in New York to the New England area with headquarters in Boston.

Mr Green joined Atlas as a chemist in 1951.

Charles M Standart has been promoted to chief engineer of Becco Chemical Division, Food Machinery and Chemical Corporation, Buffalo, NY, succeeding **James N Vermilya,** who is retiring but will continue to serve FMC as a part-time consultant to its International Division.

Mr Standart joined Becco in April, 1936, rising through various positions in the engineering department to the post of assistant chief engineer, which he has held since 1953.

Mr Vermilya is retiring after thirteen years service with Becco, during the last five of which he has been chief engineer.

Hill

Luscian

American Cyanamid Co has announced the following personnel moves:

A G Hill has been named manager of the Bound Brook, NJ, plant. With Cyanamid since 1932, when he joined the Company as a research and development chemist, Dr Hill has served the plant in several capacities, including resident technical manager and assistant plant manager.

James M McNamee has been appointed sales manager of Cyanamid's petrochemicals department. He joined the Company in 1950 at the Stamford, Conn Laboratories, and since has served in various sales capacities in New York, Boston, and Charlotte.

Stephen J Luscian, who joined Cyanamid in 1943 and has since served as technical service representative at Bound Brook, has been named southwestern sales representative for the Organic Chemicals Div. He will be responsible for the sale of all dye, textile chemical, intermediate, and petrochemical products of Cyanamid. His headquarters will be at the Company's Los Angeles branch sales office at 2300 South Eastern Ave.

The election of three new directors and the reelection of a fourth was announced recently by Chas L Huisking & Co, Inc, New York, N Y.

New directors are: **Challen R Parker Jr** senior vice president, The Hanover Bank; **John E Haigney**, partner, Ide & Haigney; and **Richard Stienschneider Jr**, vice president, Integrity Insurance Co. Re-elected was **Benjamin Sack**, senior partner, Sack, O'Connor & Sack.

Thomas J March has been appointed manager-sales for the Silicone Products Department, General Electric Co, succeeding **John T Castles**, who has become general manager of the chemical development operation of the Company's Chemical & Metallurgical Division.

Mr March was formerly manager-materials and devices sales for the G-E Specialty Electronic Components Department in Auburn, N Y.

Several important personnel changes in the staff of Alco Oil & Chemical Corp, Philadelphia, Pa, were announced last month.

John P Seguin, New England sales representative, was promoted to the post of vice president by the board of directors. Mr Seguin has maintained a regional sales office in Providence, RI, since joining Alco in January, 1953, to service the sales of latex compounds and rubber chemicals in the New England area.

Roger B Gookin has been appointed a sales representative and will service sales of latex compounds and rubber chemicals from the Company's Providence office. Mr Gookin was formerly associated with General Latex & Chemical Corp, Cambridge, Mass.

Daniel L Worth has been appointed to represent the Company in the South from a new regional office to be located in or near Greenville, SC. This is a transfer from his position as a development chemist, which started in August, 1956, in the Research Laboratory and later in the Sales Service Laboratory where he specialized in the evaluation and applications of warp sizing chemicals and acrylic latexes for textile coatings. Mr Worth may be reached at 23 Westview Avenue, Station B, Greenville.

Thomas C Holst has been appointed a technical sales representative for the sales and application of latex compounds and chemicals for the textile, paper, and adhesive trades. Mr Holst was formerly associated with General Latex & Chemical Corp. as Middle Atlantic representative.

Richard J Mahoney has joined Alco as a member of the Sales Service Laboratory. Mr Mahoney was formerly employed by the Naugatuck Chemicals Div, US Rubber Co, as a development chemist.

Ciba Co, Inc, has announced the recent appointment to its technical sales staff of **Colin D Quinn**, who will be its representative to the leather trade in the Midwest.

Mr Quinn was formerly with General Split Corp, Milwaukee, Wis, and Cudahy Tanning Co, Cudahy, Wis.

After a period in the New York laboratories of Ciba, he will take up his new duties in the Midwest, working from Ciba's Skokie, Ill, office.

CORRECTION

Your attention is called to an error on page 105 of the February 9 issue.

In the first column, a photo of John T Taylor appears. John T Taylor is with Rohm & Haas Co (see page 49 of this issue). The item about John R Taylor is correct as it stands.

Union Carbide Chemicals Co, division of Union Carbide Corp, has announced the following promotions:

Lester D Berger, formerly a product manager in the New Chemicals group, has been appointed assistant manager of the group. In his new position he will be responsible for the major development areas of water-soluble chemicals and surface-active agents.

Two product managers, **Sebern G Sellers** and **Eugene P Fisler Jr**, were appointed to assist Mr Berger. Sellers will be responsible for Polyox water-soluble resins and Cellosize hydroxyethyl cellulose. Fisler will be responsible for Tergitol surfactants.

Bruce A Gustin, formerly district manager for the Boston District, is promoted to Eastern Division manager.

George S Cooper Jr, previously a technical representative in the New York District, is promoted to assistant district manager, New York District.

Theodore J Hamilton, promoted to district manager of the Albany District, was previously a technical representative in the Philadelphia District.

James R Retter, formerly Albany district manager, is promoted to district manager of the Boston District.

New appointments in the Central Sales Office, Solvay Process Div, Allied Chemical Corp, include those of **Robert E Clagett** as assistant to the manager, Organic Chemicals Section, and **Arthur S Swenson Jr** as assistant to the manager, Special Chemicals Section.

Both men have served Solvay as salesmen, Mr Clagett since 1952 at the Cincinnati sales branch, and Mr Swenson since 1953 at the Chicago sales branch. They will be located at 61 Broadway, New York, NY.

Solvay has also announced the appointment of **Daniel Post** as market research analyst and **Loy R Whiteside** as manager of the Chicago, Ill sales branch. Mr Post had been engaged in product development activities at Allied Chemical's Nitrogen Division New York office. Mr Whiteside, who will supervise Solvay's sales in Minnesota, Iowa, Wisconsin, the Dakotas and Montana as well as sections of Illinois and Indiana, succeeds **James M Murphey**, who retired January 31 after 35 years with Solvay.

Charles Edgar Daniels, a junior in the School of Textiles at North Carolina State College, has been awarded the $450 Geigy Dyestuff Scholarship at the college for the current school year.

Roy A Pizzarello, manager of pigment and dye research and development for Interchemical Corp's Color & Chemicals Div, Hawthorne, NJ, receives Fordham College Alumni Association Award for achievement in science from the Association's president, Thomas E Paradine, at its 105th annual dinner in New York. Looking on are Vice President Richard M Nixon, principal speaker at the event, and the Very Rev Laurence J McGinley, S J, Fordham's president.

MAX EINSTEIN, 64, vice president of Standard Chemical Products, Inc until he went into semiretirement last year, died January 18th at home of his sister, Mrs W R Hoffman, in Greensboro, NC.

A native of Bachau, Germany, he lived in this country 46 years and served as Southern sales representative for Standard Chemical Products, Inc, since 1920. Funeral services were held in Greensboro on January 20th. Cremation services were held and remains were interred in Asheville, NC. Surviving are three sisters and one brother.

Eulogy was paid to the memory of Mr Einstein at the meeting of the Piedmont Section, AATCC, held in Greenville on January 24th. It was stated "Mr Einstein will be missed by his countless friends in the industry. His generous spirit transcended all bounds of religious barriers and his loss and kindly spirit will be missed over a wide area."

FRANK J O'NEIL, who had joined American Conditioning House, Inc, Boston, Mass, last October to direct the firm's laboratories and technical activities in Boston and San Angelo, Texas, died suddenly at his home in Newton, Mass, on November 29. Death was due to heart disease, presumably coronary arteriosclerosis.

As a graduate of Lawrence High School, Mr O'Neil began his career as a laboratory assistant in the Chemical Department of Pacific Mills' Worsted Division in Lawrence with John N Dalton, chief chemist, and Harold W Leitch, general superintendent. He attended and was graduated from Lowell Technological Institute with a certificate from the Textile Dyeing and Finishing Course.

As he evinced a great enthusiasm for further education in textile testing, and since the company needed a textile physicist, Mr Leitch arranged with Pacific Mills to enroll Mr O'Neil as a special student at Massachusetts Institute of Technology, specializing in textile physics. At this institution, he studied with Professors Schwarz and Hardy, and, as a result, became quite proficient in microscopy, spectroscopy and color analysis with the Hardy-GE Recording Spectrophotometer. Mr O'Neil was regarded as a pioneer in introducing these techniques into a textile control laboratory.

He became an expert in the evaluation of color and color matching of textiles and the proper illumination for such work. As a result he became a member of the Optical Society of America and contributed to its activities as a representative of the textile manufacturing industry.

In 1944, the Pacific Mills Worsted Div established an extensive Research Division with Mr Leitch as director. Mr O'Neil was made director of the Physical Research Dept,

FRANK J O'NEIL

and under his supervision, much valuable work was carried on in electronics, physical testing and color analysis. He worked in close cooperation with the Engineering and Processing Research Departments.

After Burlington Industries acquired Pacific Mills, the Lawrence plants with the Research Division were abandoned in 1957. Mr O'Neil was then transferred to the Greensboro, NC laboratories of Burlington Industries, where he established a physical testing laboratory for the Pacific Mills Craft Division of Burlington Mills. He continued in this capacity until up to a short time before joining American Conditioning House, Inc.

Mr O'Neil made many contributions to AATCC. He was a past chairman of the Northern New England Section, a former national Councilor, chairman of the Intersectional Contest Committee for several years, and a member of many Research Committees involving physical testing and color. At the time of his death, he was serving as an AATCC representative on the Inter-Society Color Council. Mr O'Neil was also an active member of ASTM.

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